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PAPER TRADE JOURNAL

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WOOD PULP

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ANNUAL TAPPI ISSUE

...m Meetings Launch TAPPI on Busy Autumn Program
...orthern Mills Names Den Dooven Superintendent
...ongress Probes OPA on Paper Curb Report
Ferguson Leaves Eagle A to be Curtis Superintendent
Becker Sees Little Pulp Coming From Sweden
Plan $2 Million Project at Sturgeon Falls

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"As You Like It"
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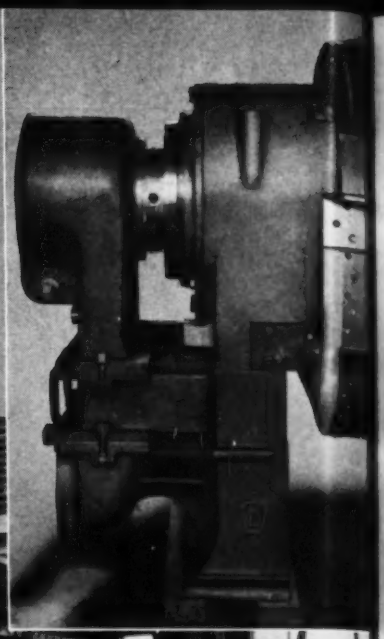

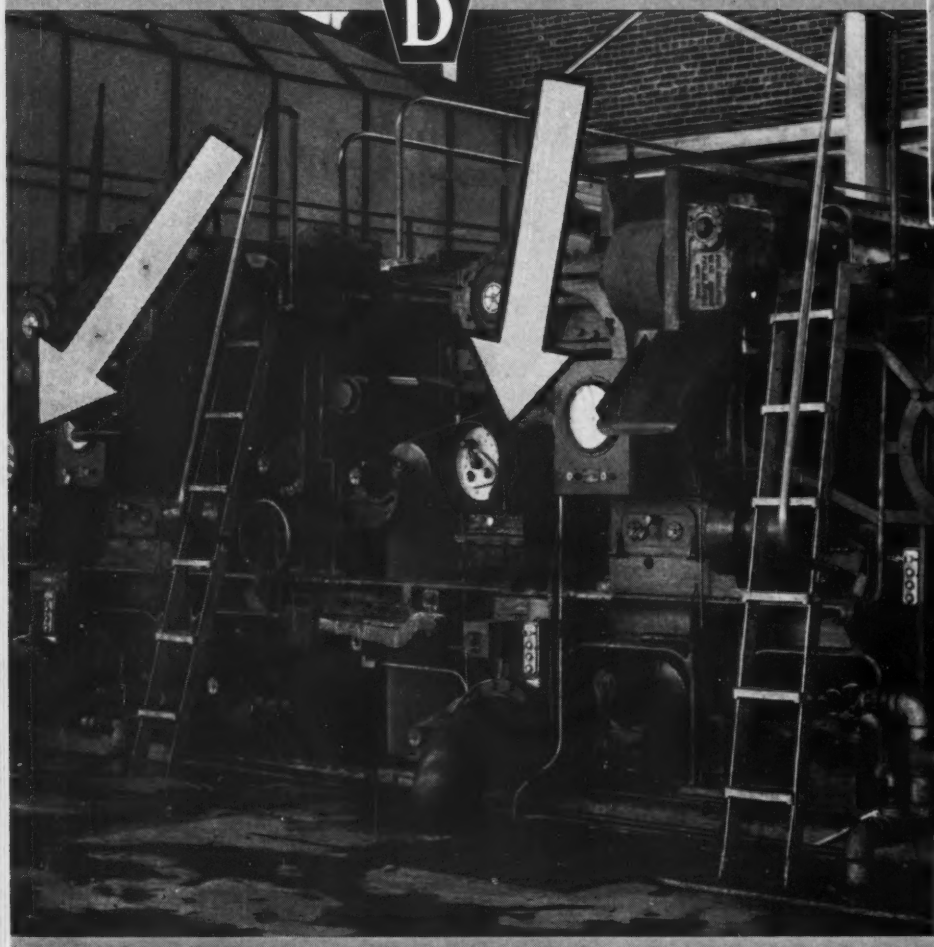

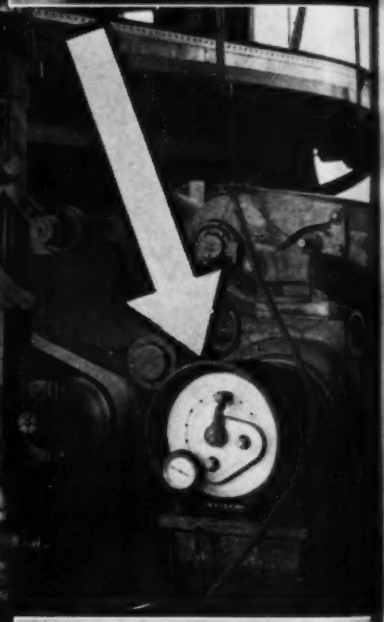

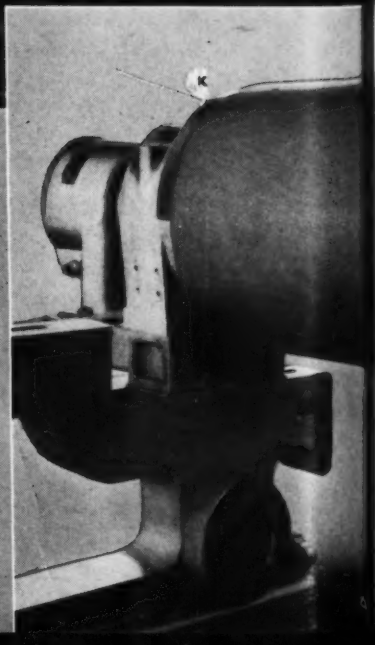

Downingtown Suction Couch and Press Rolls are available with front or rear end suction, or with suction connection at both ends, if desired. Front end suction connection may be inside or outside the machine, as illustrated at the right, top and bottom of this advertisement. All of these arrangements are standard with us, thus no special construction is needed. Press rolls are available with or without rubber covering and we will gladly recover your old press rolls. Send for Catalog No. 120.

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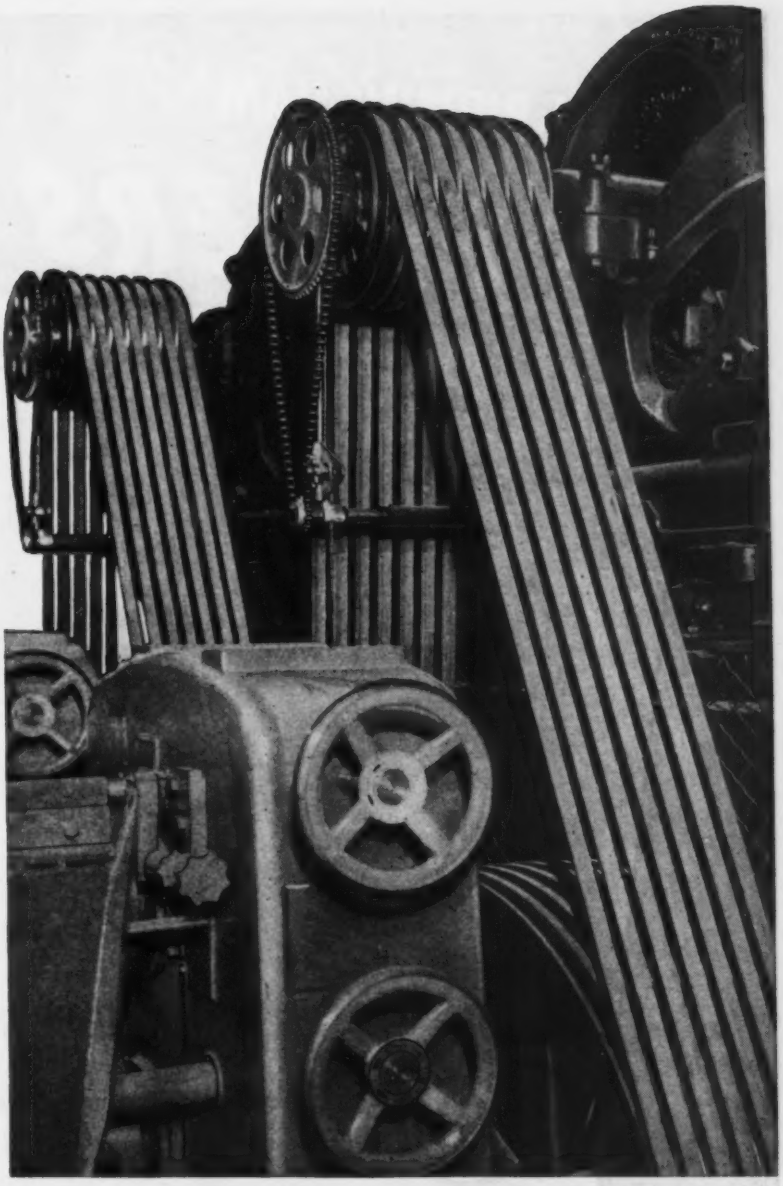

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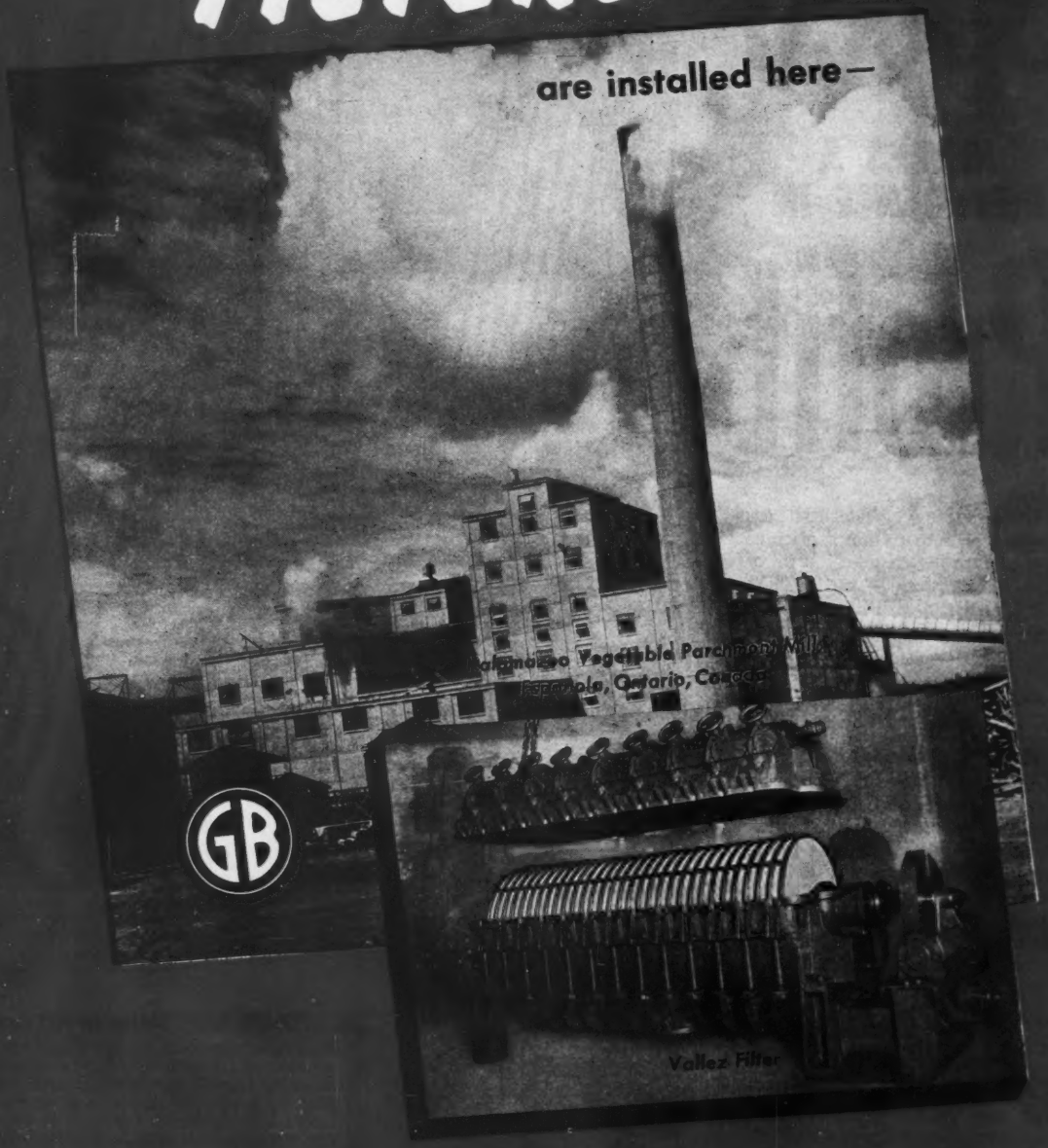

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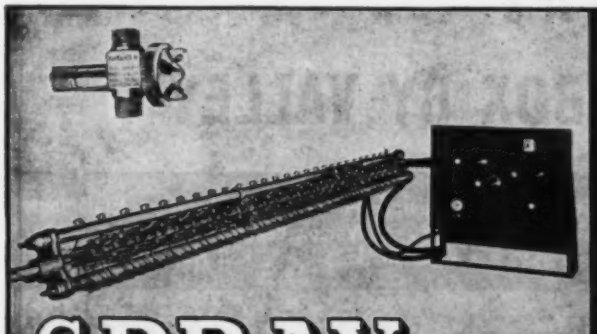

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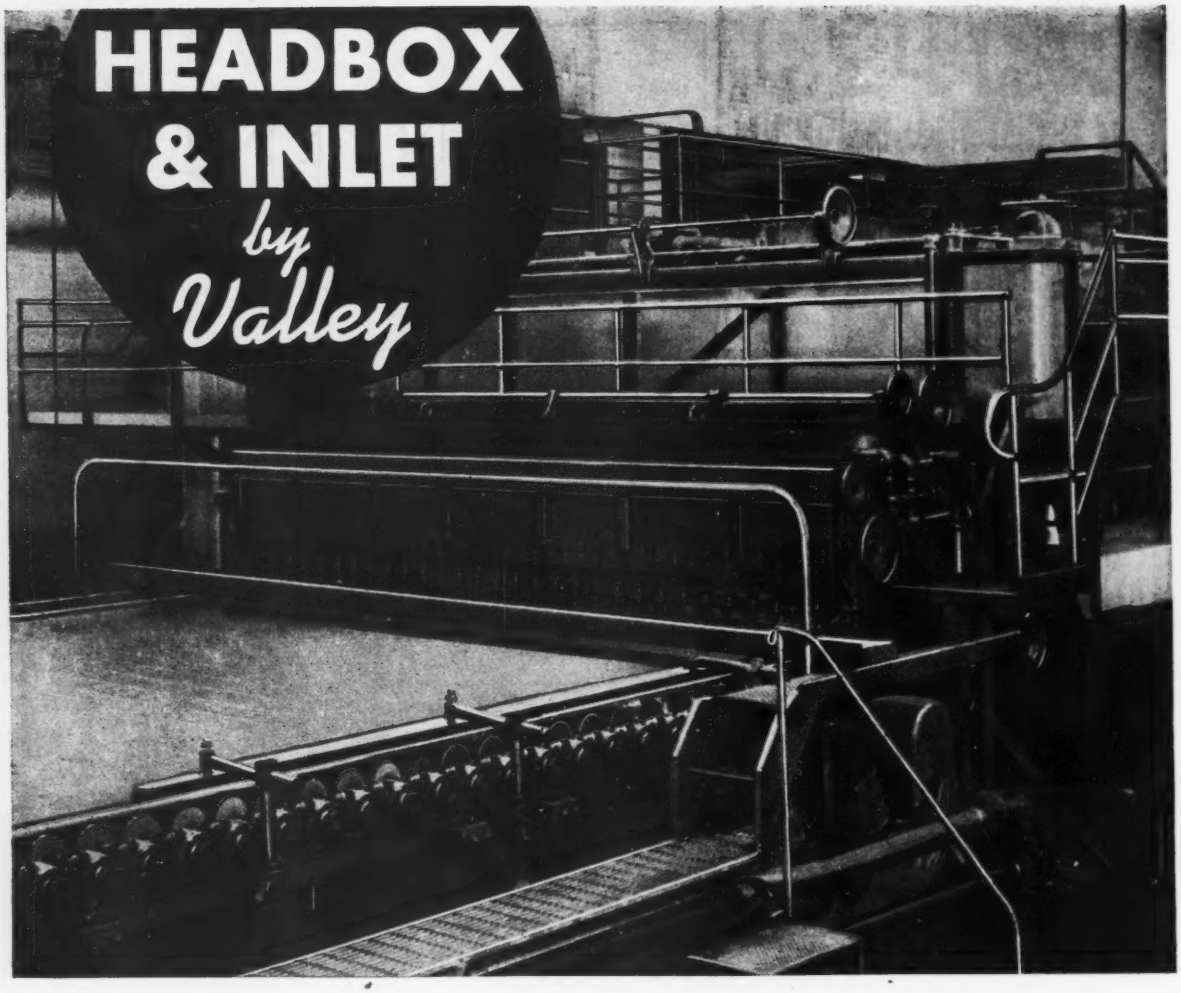

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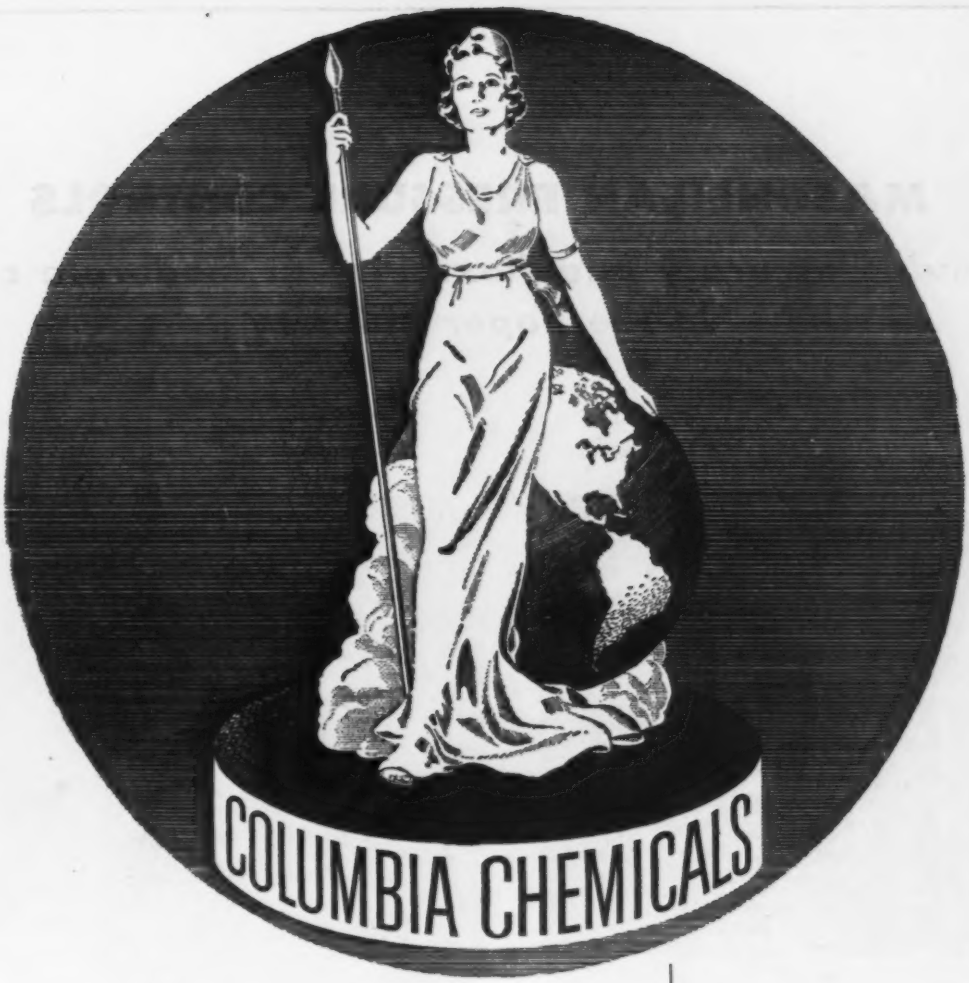

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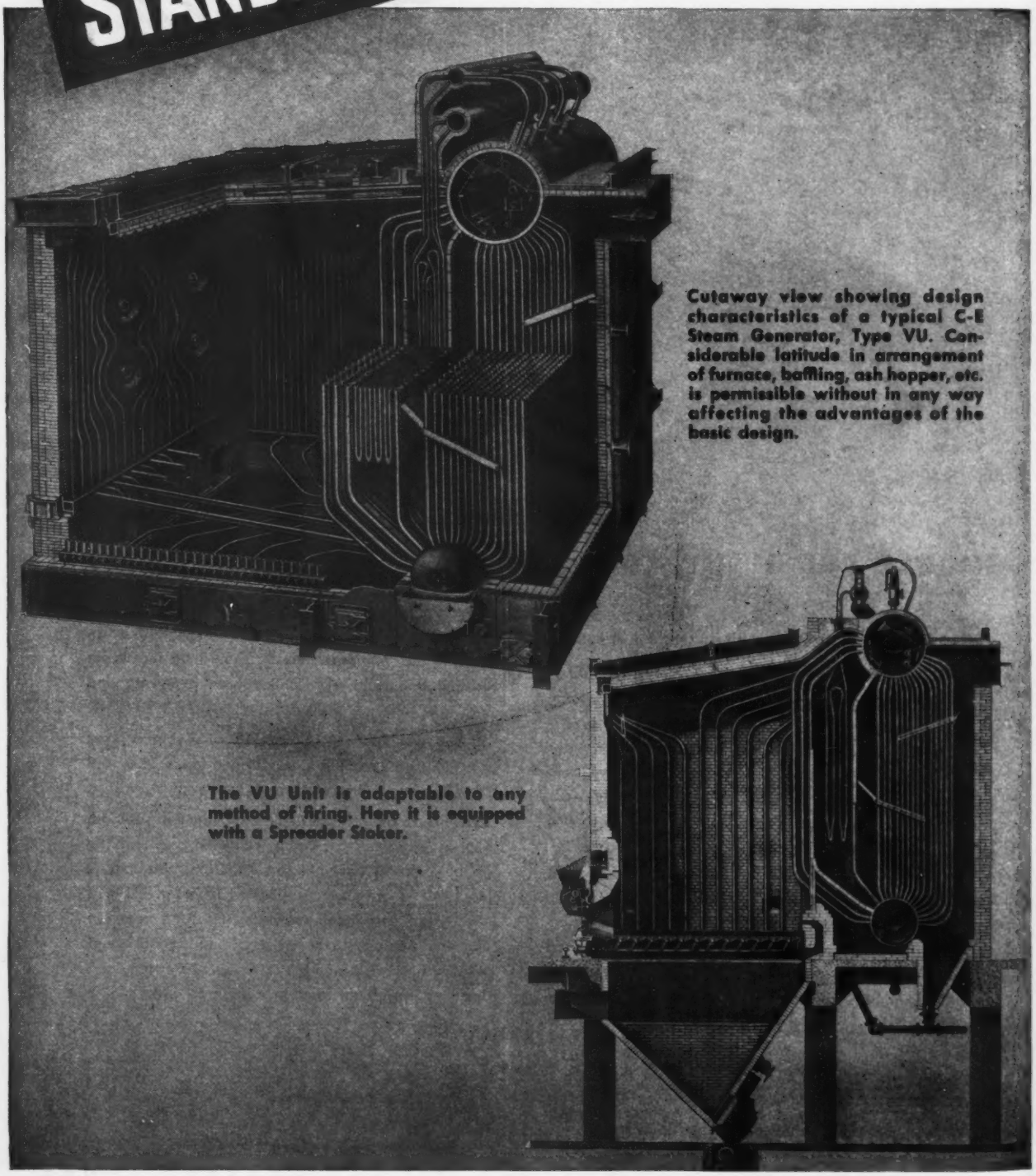
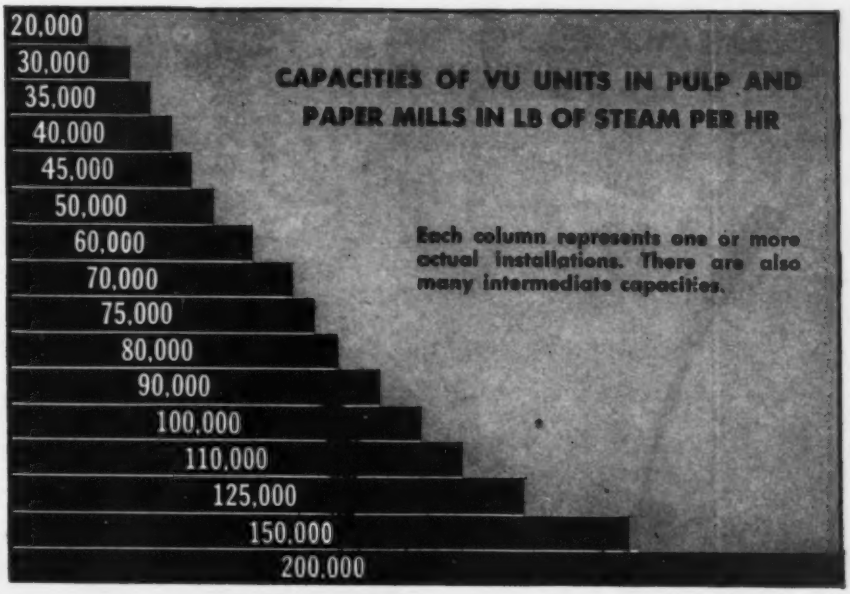


Cutaway view showing design characteristics of a typical C-E Steam Generator, Type VU. Considerable latitude in arrangement of furnace, baffling, ash hopper, etc. is permissible without in any way affecting the advantages of the basic design.

The VU Unit is adaptable to any method of firing. Here it is equipped with a Spreader Stoker.

UNIT MEETS A WIDE RANGE OF PAPER MILL REQUIREMENTS



WHAT, specifically, is meant by a *wide* range of requirements? Obviously it includes all the usual items such as capacities, pressures, temperatures, fuels, space limitations and the like. But, in the case of Combustion Engineering's VU Steam Generator, it goes much further — it includes high availability and high efficiency. It extends to such important considerations as the balance between initial investment and long range operating economy.

That the VU Unit meets *all* of these requirements is proved by the extent and variety of installations as well as performance records. VU Units have been installed in pulp and paper mills all over the country as well as in Canada and South America. Capacities of these units cover the range shown by the above chart; design pressures are from 150 to 1000 psi; steam temperatures range up to 825 F. These installations employ various fuels and methods of firing. Some are pulverized fuel fired, some oil, others gas and several use these fuels in combination. Still others are stoker fired employing spreader or underfeed stokers. Units designed for bark burning and those that use wood as an auxiliary fuel are also included.

The VU Unit is designed for high efficiency. Actual efficiencies, depending upon fuels and operating conditions, range up to about 88%.

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* * *

During a 12-month period since September 1st, 1945, pulp and paper companies have ordered VU Units having an aggregate capacity of 3,000,000 lb of steam per hr — a striking indication of the extent to which that industry has decided that this unit is the best answer to its steam generation requirements. A-913-A

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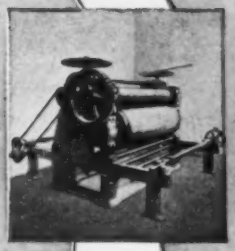
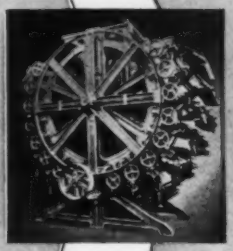
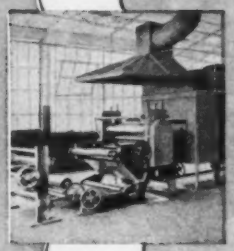
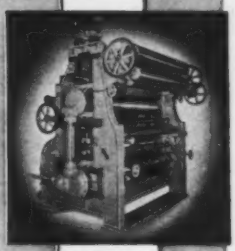

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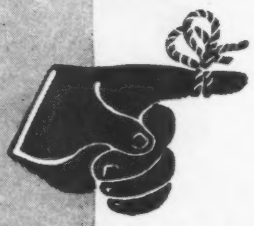

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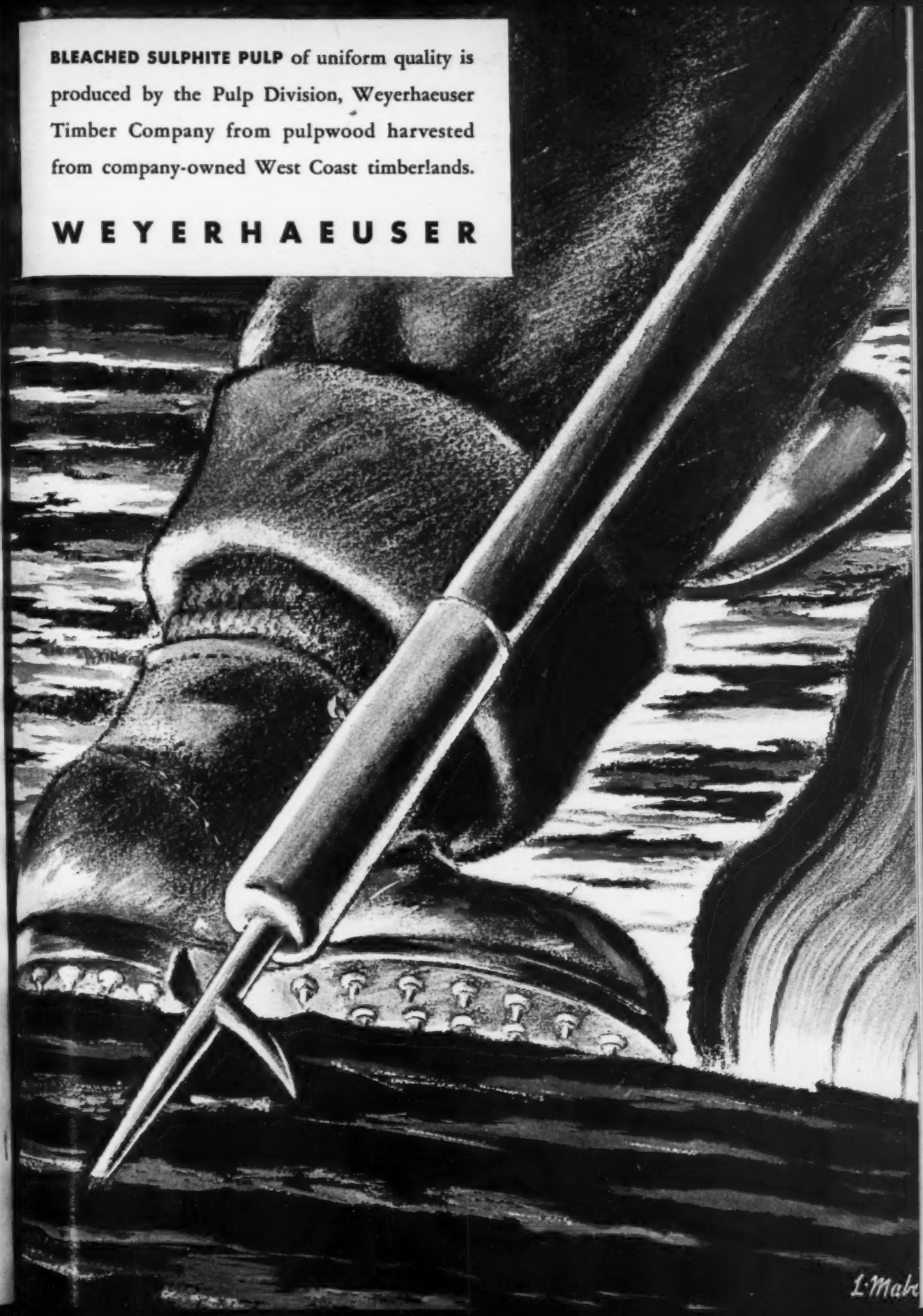
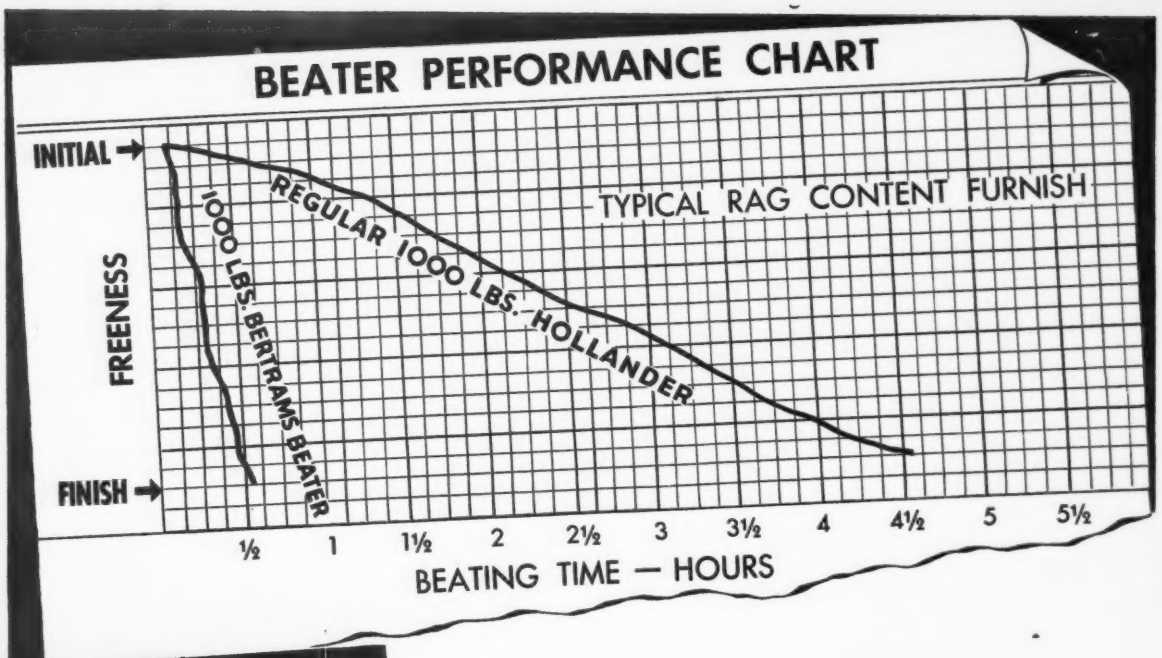
LIQUID CONDITIONING CORPORATION
423 West 126th Street, New York 27, N. Y.

BLEACHED SULPHITE PULP of uniform quality is produced by the Pulp Division, Weyerhaeuser Timber Company from pulpwood harvested from company-owned West Coast timberlands.

WEYERHAEUSER





UNIFORM FIBRE TREATMENT

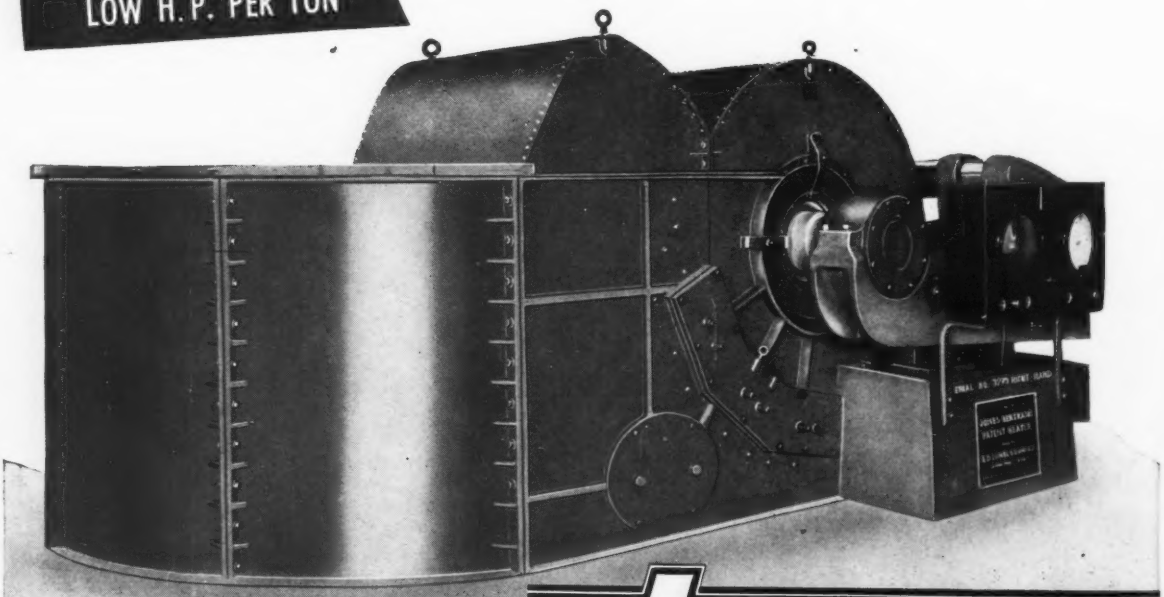
SHORT BEATING CYCLE

AUTOMATIC CONTROL

LOW H. P. PER TON

MORE AND BETTER WORK IN LESS TIME

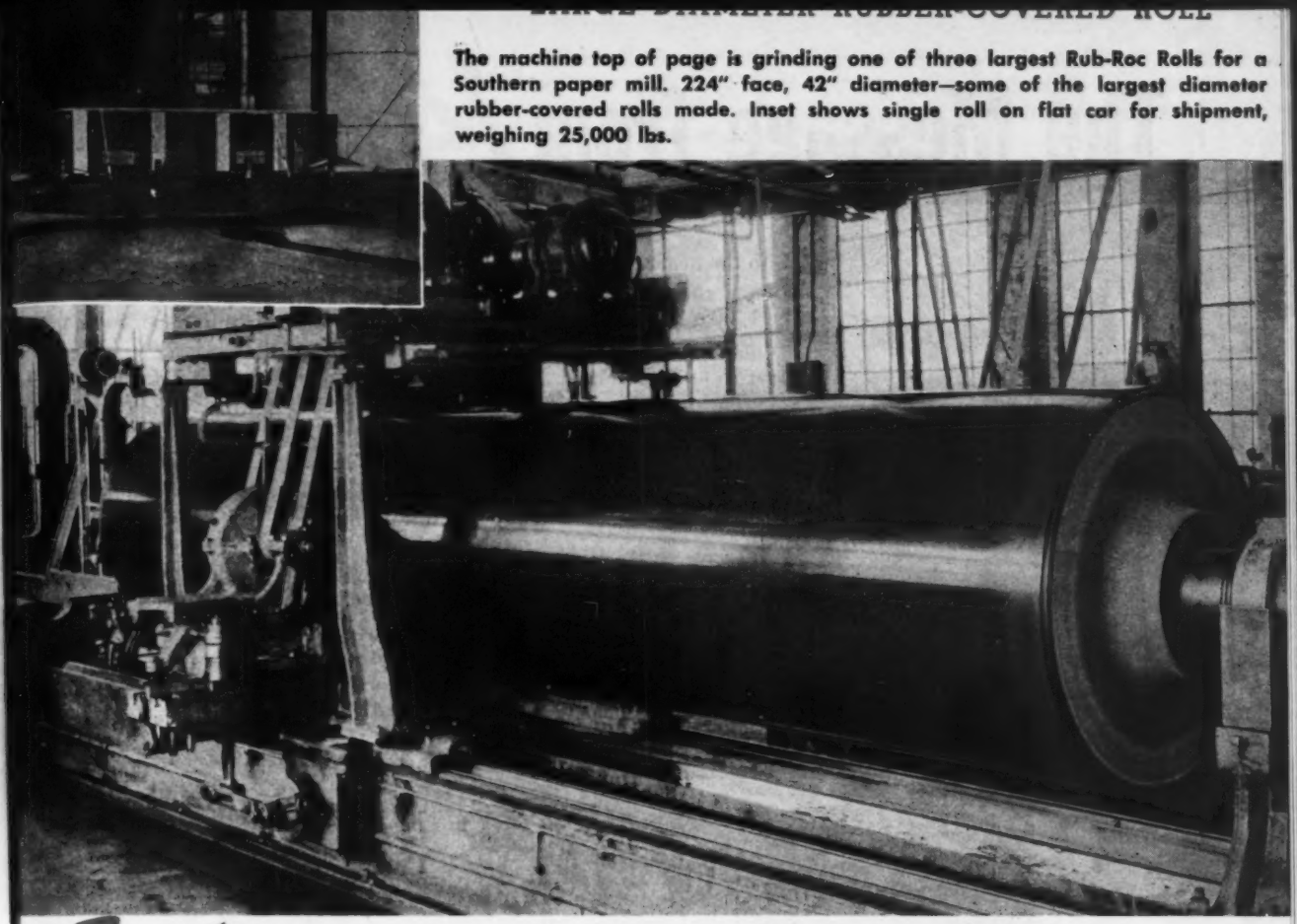
While above chart is typical of rag furnish, comparable results are being obtained on all other grades of paper.



JONES-BERTRAMS PATENT BEATER

Jones

E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills



The machine top of page is grinding one of three largest Rub-Roc Rolls for a Southern paper mill. 224" face, 42" diameter—some of the largest diameter rubber-covered rolls made. Inset shows single roll on flat car for shipment, weighing 25,000 lbs.

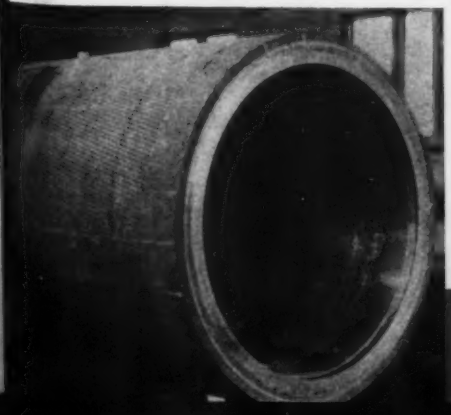
Facilities
Experience

TO GRIND THE BIGGEST ROLLS
TO INSURE THE HIGHEST PERFORMANCE
AT MANHATTAN

At Manhattan the latest and biggest machines are installed to handle "any and many" roll recovering jobs. The huge machine pictured here is grinding to within .002"—typifying the mechanical excellence which is responsible for the near-perfection of Manhattan Rolls.

Controlling these machines, and the hand-skilled techniques of roll covering, are Manhattan men with up to 40 years' experience. Equally seasoned technical men are out in the field working closely with paper manufacturers and the Manhattan laboratories.

The illustrations shown here exemplify the **Capacity** of Manhattan machines and the **Reputation** of Manhattan craftsmen. Take advantage of savings they can make for you on your next recovering job.



LARGE SUCTION PRESS ROLL

Covered by Manhattan for a prominent Eastern paper mill. 245" face, 34½" finished diameter, rubber 1" thick.

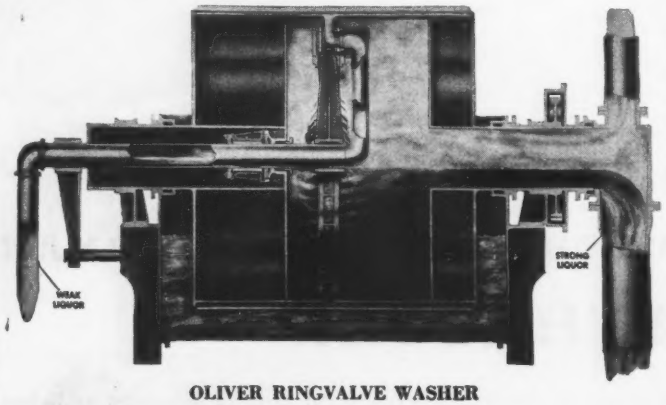
Plants at Passaic, N. J. . . . Neenah, Wis. . . . North Charleston, S. C.

RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION
EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSEY

The Message from 1400 Oliver

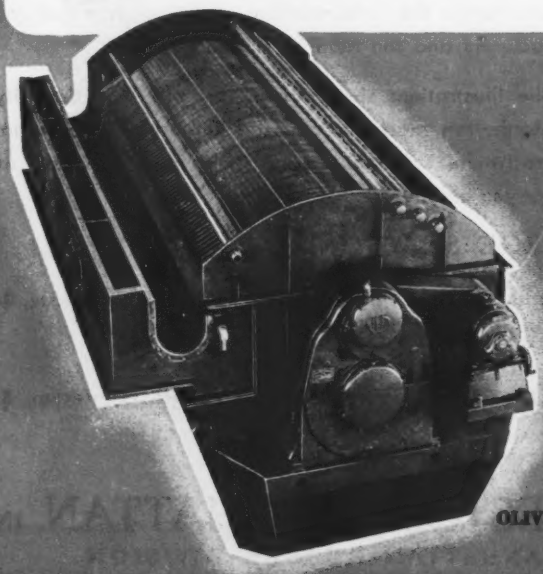
With the nearly eighty Oliver Ringvalve Filters, to say nothing of the other Olivers, installed during 1945 and early 1946, we have passed well beyond the 1400 mark of Oliver Filters purchased by the pulp and paper industry throughout the world. Most of these filters are still in service — some of them 15 to 20 years old. In considering this record, it will be of interest to note that the basic principle of continuous vacuum filtration, first applied by Oliver United to the paper industry's problems in 1921, is as sound today as ever. The filter design is better, of course, and, in the light of experience and changing requirements, has been developed along new lines to give even greater efficiency and durability.

One of the most effective of the recent designs is the Oliver Ringvalve Filter which, for washing or thickening free stocks, is far superior to anything else. Oliver Savealls have several alternate methods for discharging the sheet, adding to the usefulness of these essential filters. And the Oliver Board Forming Machine is making an excellent record both as to capacity and to quality of board produced.

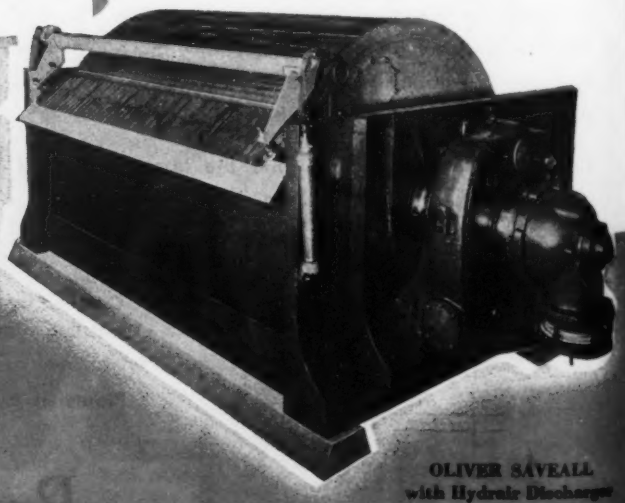


OLIVER RINGVALVE WASHER

For twenty-five years, Oliver United has contributed much to the progress made by pulp and paper mills. The 1946 Olivers would be excellent investments for companies desiring to enlarge their mills, modernize or build anew.



OLIVER GROUND WOOD WASHER
with Hydrair Discharger



OLIVER SAVEALL
with Hydrair Discharger

Pulp Filters—

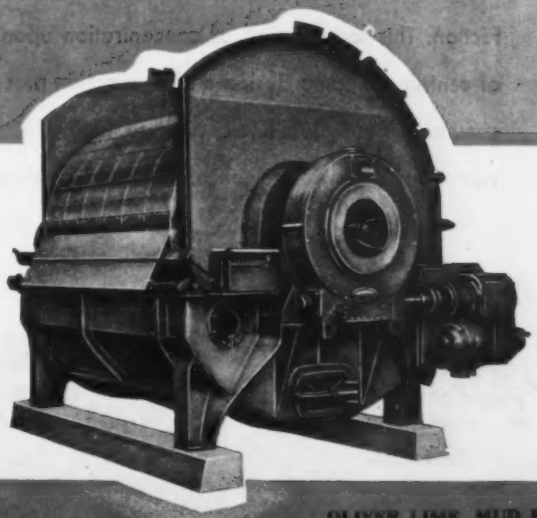
"You won't go wrong with an Oliver"

OLIVER Ringvalve High Density Thickener
OLIVER Ringvalve Sulphate Washer
OLIVER Ringvalve Sulphite Washer
OLIVER Ringvalve Bleach Washer
OLIVER Ringvalve Soda Washer
OLIVER Ringvalve Decker
OLIVER Ground Wood Decker and Washer
OLIVER Board Forming Machine
OLIVER High Density Thickener
OLIVER Lime Mud Filter
OLIVER Pulp Washer
OLIVER Saveall

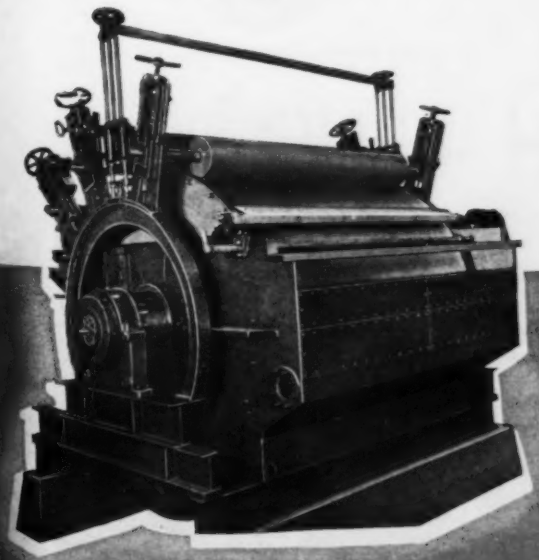
Folders . . .

Folders F106 and F109 outline the design and operating values of the Oliver Ringvalve Decker and Washer and of the Oliver Savealls. Send for copies.

OLIVER UNITED FILTERS INC.



OLIVER LIME MUD FILTER



OLIVER BOARD—FORMING MACHINE

New York 18, N. Y.
33 West 42nd Street

Chicago 1, Illinois
221 N. LaSalle Street

San Francisco 11
California

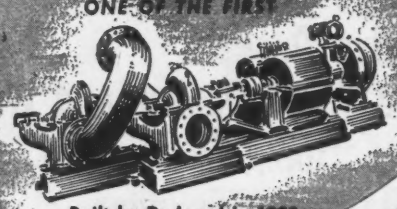
Western Sales Division
Oakland 1, California
2900 Glascock Street

Canada: Sales & Manufacturing Representative, E. Long Limited, Orillia, Canada

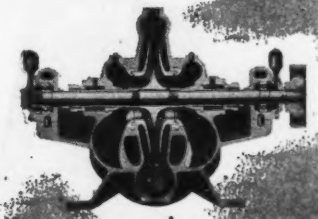
Factories: Oakland, Calif. - Hazleton, Pa. - Orillia, Canada - Melbourne, Australia

45 Years of PUMP IMPROVEMENT

ONE OF THE FIRST

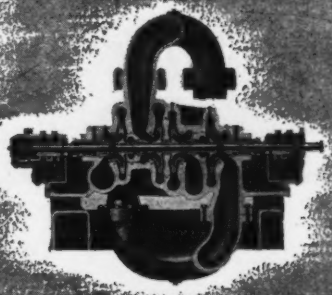


Built by De Laval in 1902

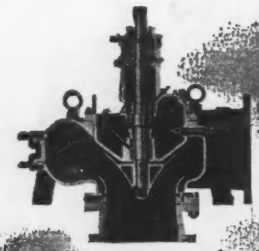


SINGLE STAGE, DOUBLE SUCTION PUMP

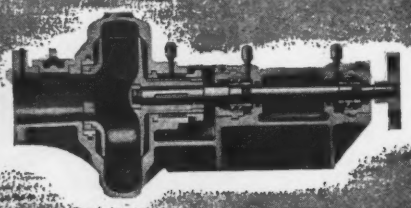
Modern De Laval centrifugal pumps represent the culmination of more than 45 years of continual improvement and perfection. This long period of concentration upon the problems of centrifugal pump design and application places at the user's command a complete line of modern, high quality pumps and a vast store of knowledge concerning pump application problems.



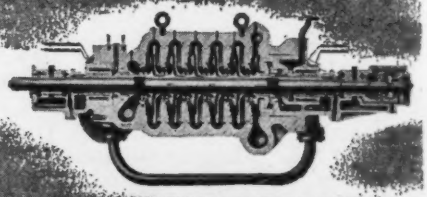
FOUR STAGE, OPPOSED IMPELLER PUMP



MIXED FLOW PUMP



CLOGLESS PUMP



HIGH PRESSURE MULTI-STAGE PUMP

GP-1

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

DE LAVAL

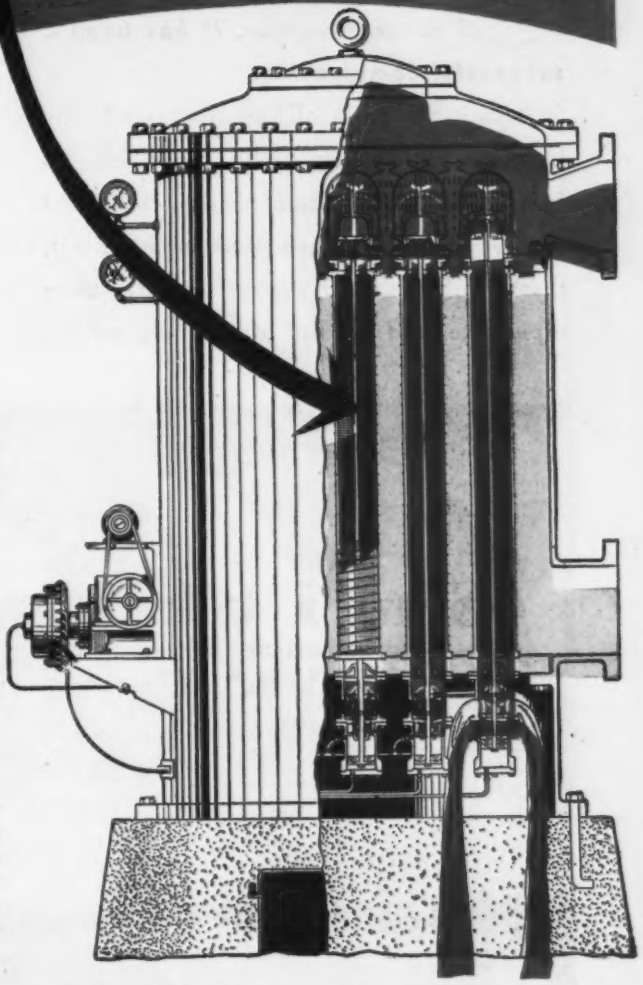
STEAM TURBINE COMPANY
TRENTON 2, NEW JERSEY

SALES OFFICES: ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER • DETROIT • DULUTH • EDMONTON • GREAT FALLS • HAVANA • HELENA • HOUSTON • KANSAS CITY • LOS ANGELES • MONTREAL
NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA • VANCOUVER • WASHINGTON D.C. • WINNIPEG

ADAMS AUTOMATIC WATER FILTERS

Performance-Proved

BY THE PAPER INDUSTRY



√ *for* PRIMARY FILTRATION

PORO-SCREEN Filters are a practical method for filtering water direct from the river or other source. Removes sand and grit 15 times finer than 1/32". Delivers a large volume of filtered water suitable for general mill service in the processing of newsprint, box board and other coarse grades of paper stock.

√ *for* SECONDARY FILTRATION

PORO-STONE Filters provide effective filtration for water required in high grade paper stock. Installed following sand filter equipment, the PORO-STONE Filter eliminates finest sand, pipe scale and all foreign matter which might impair paper quality.

•

ADAMS Filters (both PORO-SCREEN and PORO-STONE) are designed for continuous, automatic operation. No moving clearances to pass foreign material—no shut-downs required by back-wash cleaning—very little attention needed. *Constant filtration assured at all times.* Built in several sizes to meet your requirements. Write for Bulletin 901.

★ R. P. ADAMS COMPANY, INC. ★

77 CHICAGO STREET, BUFFALO, N. Y.

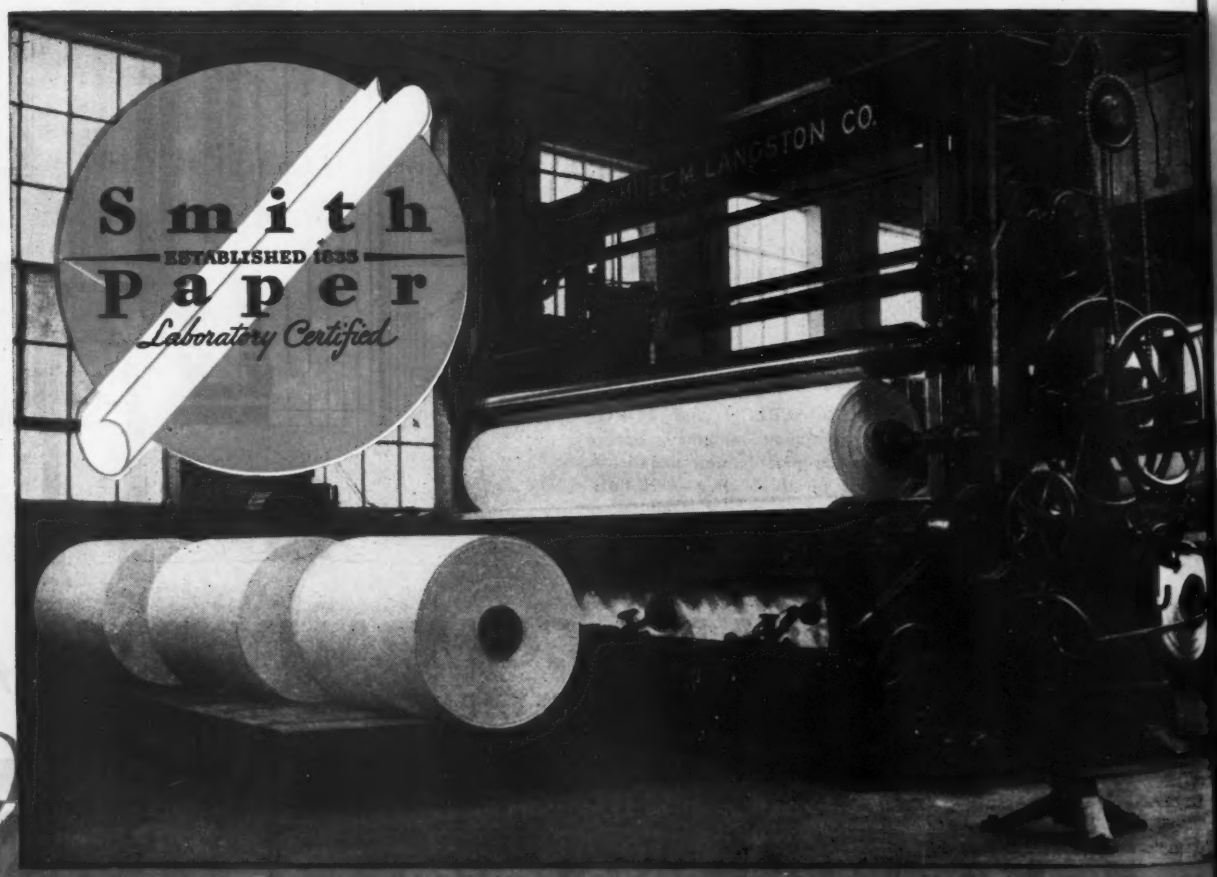
ADAMS PORO-STONE AND PORO SCREEN FILTERS

Flint and steel have been associated in people's minds for a lot longer than any of us can remember. ***It has been a successful combination.***

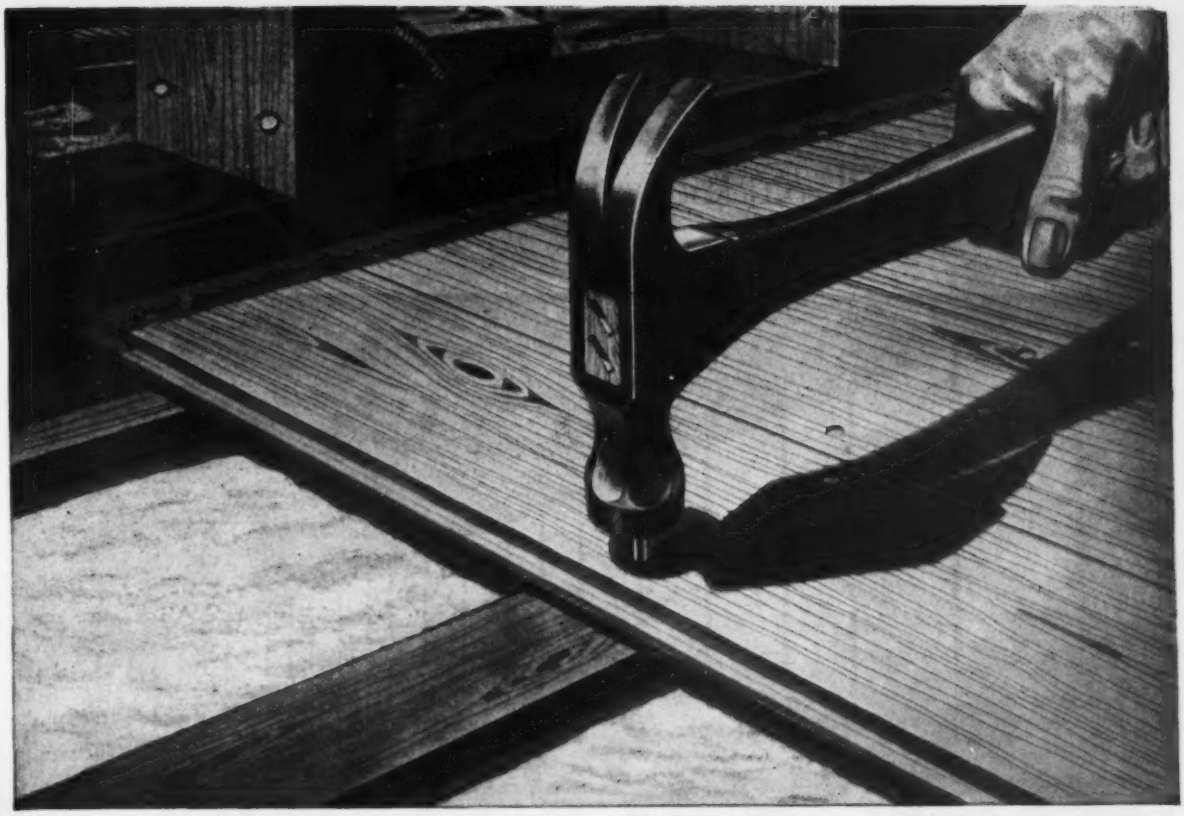
So also is the team of Langston and Smith. Langston Slitters help Smith Paper, Inc., to turn out cigarette tissue of the very finest quality. There is no guesswork in that plant, thanks to Smith's 109 years of manufacturing experience, and the use of such dependable and efficient machinery as the Langston Slitter. For a true, clean cut, for rolls of uniform density from core to outside diameter, ***for unbeatable performance, high speed operation and low maintenance, specify Langston.***

SAMUEL M. LANGSTON COMPANY

CAMDEN, NEW JERSEY



Langston



"Down-to-earth" floors call for down-to-earth thinking

Whenever you lay floors at grade, or sub grade . . . it's particularly important to use pressure-treated wood.

The moisture that is almost always present encourages the growth of fungi that cause decay. Pressure treatment poisons the food supply of the fungi. Treated wood delivers the many years of service that you have a right to expect. You'll find, too, that pressure treatment improves the wear resistance of the wood . . . a profitable extra dividend.

Remember, decay in wood is not the natural result of old age, but of *avoidable disease*. In 21 modern, fully-equipped treating plants, Koppers "inoculates" all varieties of structural lumber against this threat. Special selected treatments give enduring protection against the hazards of the individual service: decay, termites or marine borers . . . acid attack . . . fire. Our Bulletin G-23 will give you full information on the various treatments, and show you some of the many places where pressure-treated wood is serving and saving. Ask for a copy. Koppers Company, Inc., Pittsburgh 19, Pa.

K

KOPPERS

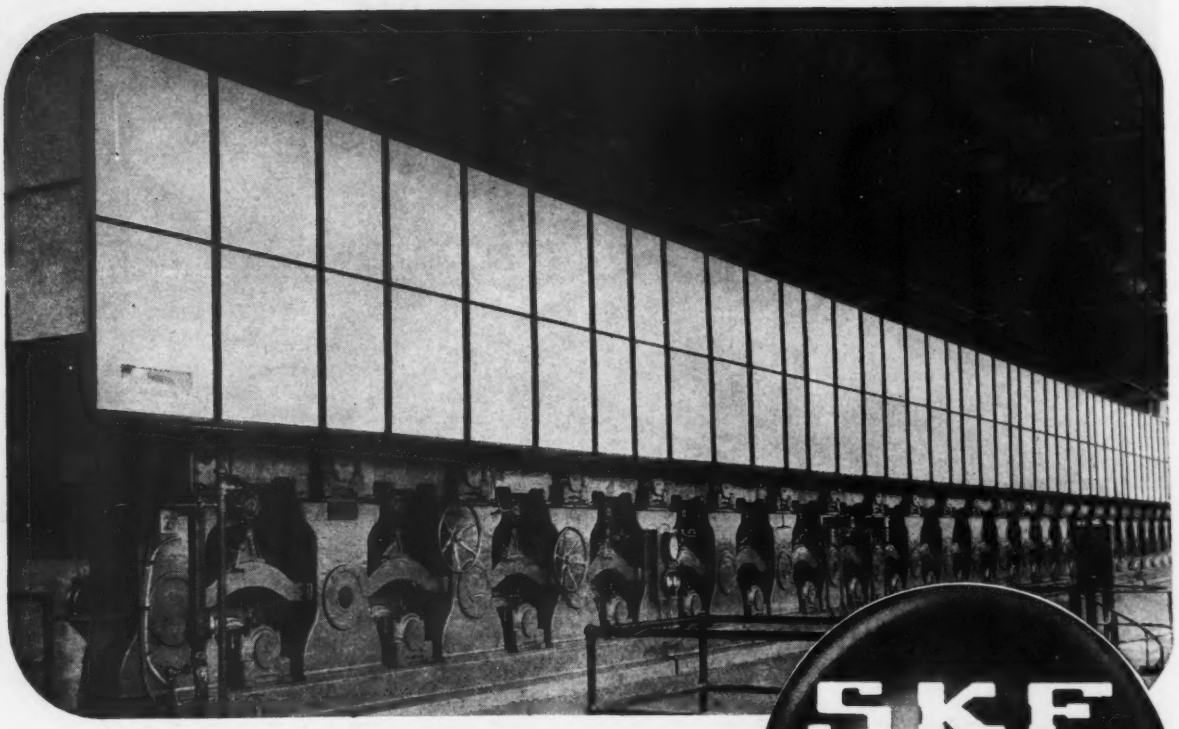
PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PA.

Continuity Certain

WITH SKF DRYER CYLINDER MOUNTINGS !

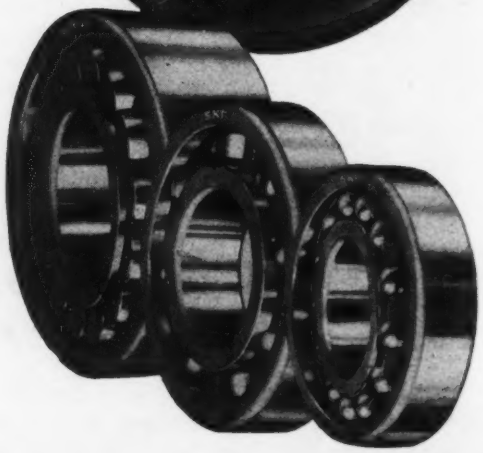


● *Dryer section of 210" Kraft Machine Built by* BAGLEY & SEWALL CO.

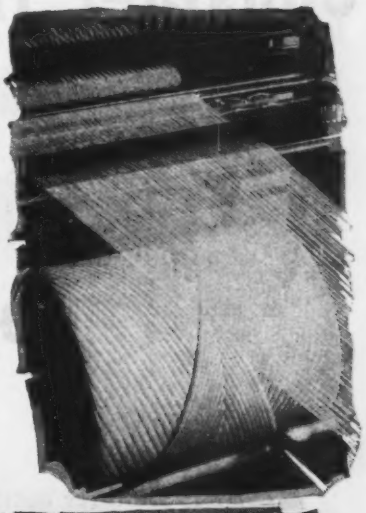
Not only did SKF pioneer the spherical roller bearing so widely used in the paper industry, but the SKF Dryer Cylinder Mounting as well. On dryer cylinders, tending side bearings are mounted in housings supported on three rockers which permit housings to move axially without resistance. This method of mounting tending side bearings, plus the *rolling alignment* of SKF Spherical Roller Bearings, assures reliability . . . permanent position of the cylinders . . . reduced power at starting . . . less strain on the felt. Engineers appreciate that SKF selects the right bearing for the right place. 6068

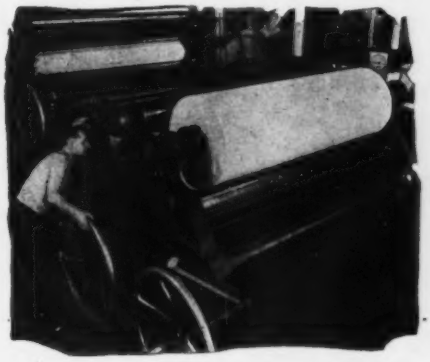
SKF INDUSTRIES, INC., PHILA. 34, PA.

SKF
Puts the Right Bearing in the Right Place



"Lowest Repair Bills in History"





. . . SINCE SWITCHING TO

Tycol **ENGINEERED LUBRICATION**

"No sticking valves . . . negligible cylinder wear — with Tycol DIESEL OILS."

"Absence of sludge and corrosion . . . no wear on bearings — with Tycol RIO TURBINE OILS."

"Superior performance under high-temperature service — with Tycol STEAM CYLINDER OIL."

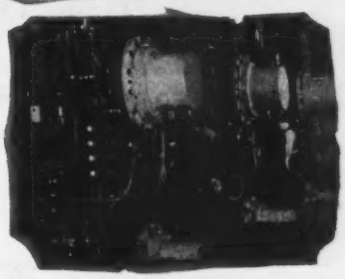
"Complete rust protection . . . corrosion eliminated — with Tycol NO-RUST-OILS."

"Maintenance costs cut 20% . . . since using Tycol E.P. Lubes."

That's how engineers and operating men express their satisfaction with the Tycol Industrial Oils and Greases they are using.

There's a Tycol oil and grease for every industrial need. For complete data on the Tycol lubricant best suited for your needs, get in touch with your nearest Tide Water Associated office today.

LUBRICATION—"ENGINEERED TO FIT THE JOB"



TYCOL

INDUSTRIAL LUBRICANTS

Boston . . . Charlotte, N. C.
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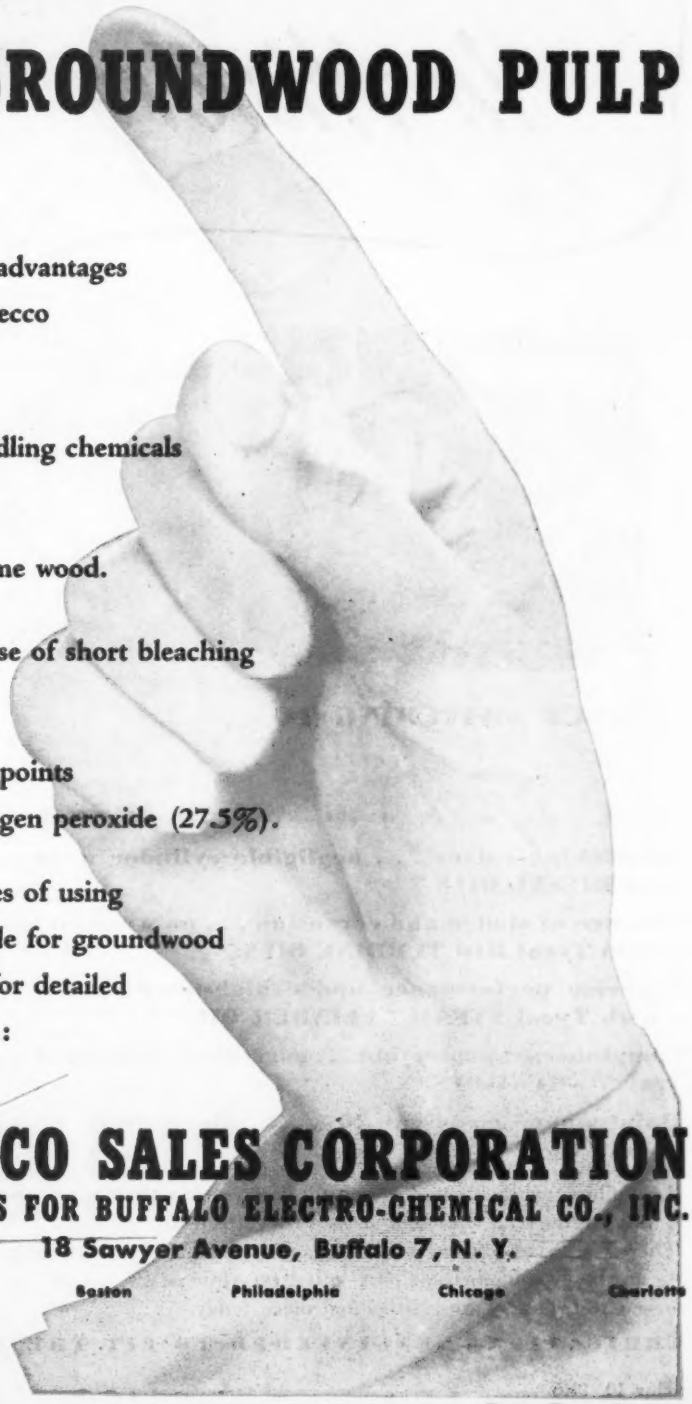
TIDE WATER ASSOCIATED OIL COMPANY

17 BATTERY PLACE . NEW YORK 4, N. Y.

Consider the BRIGHTNESS of GROUNDWOOD PULP



HERE are three outstanding advantages of bleaching groundwood pulp with Becco Hydrogen Peroxide:

1 Simplicity and safety of handling chemicals in the mill.

2 Uniform results with the same wood.

3 Maximum production because of short bleaching time required.

Brightness increases of from 10 to 15 points may be obtained with 2% hydrogen peroxide (27.5%).

Why not investigate all the advantages of using Becco Hydrogen Peroxide for groundwood bleaching? Write for detailed literature to:

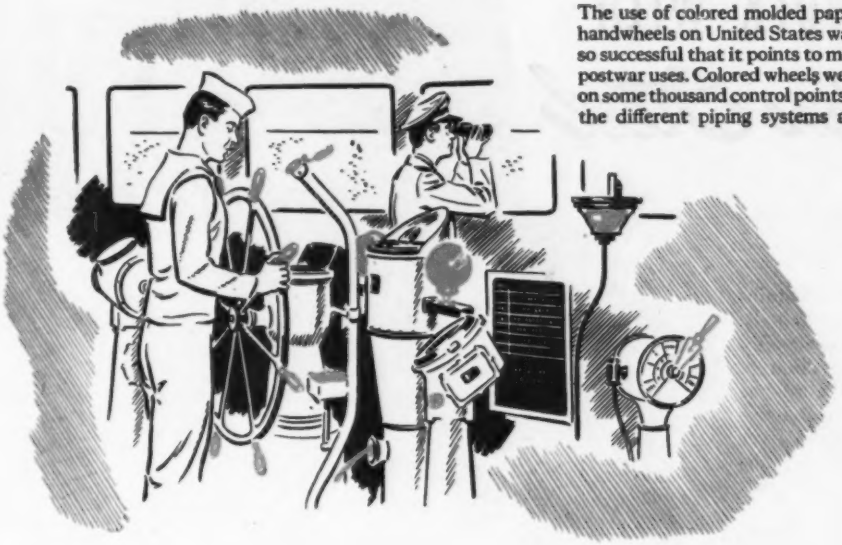
BECCO SALES CORPORATION

AGENTS FOR BUFFALO ELECTRO-CHEMICAL CO., INC.

18 Sawyer Avenue, Buffalo 7, N. Y.

New York Boston Philadelphia Chicago Charlotte

Interesting Facts About Paper



The use of colored molded paper pulp for handwheels on United States warships was so successful that it points to many similar postwar uses. Colored wheels were installed on some thousand control points to identify the different piping systems and valves.

Interesting Facts About Acid Orange

Acid Orange Y is one of the most extensively used acid colors. Its brilliant shade, excellent solubility and economy make it suitable for all types of coloring—beater, calender, dipping, and coating.

It is suitable in the production of high grade paper as well as the cheaper groundwood papers. It is extensively used in the production of salmon, mandarin, tan, and brown colors in poster, cover, boxboard, leatherboard, wrapping paper, and sheathing. In the deeper shades, better retention is obtained by increasing the amount of size and alum.

Acid Orange AD is the same shade as Acid Orange Y, but is standardized for staining purposes. Acid Orange NF is a non-foaming type for beater dyeing.

Heller & Merz Department

CALCO CHEMICAL DIVISION • AMERICAN CYANAMID COMPANY

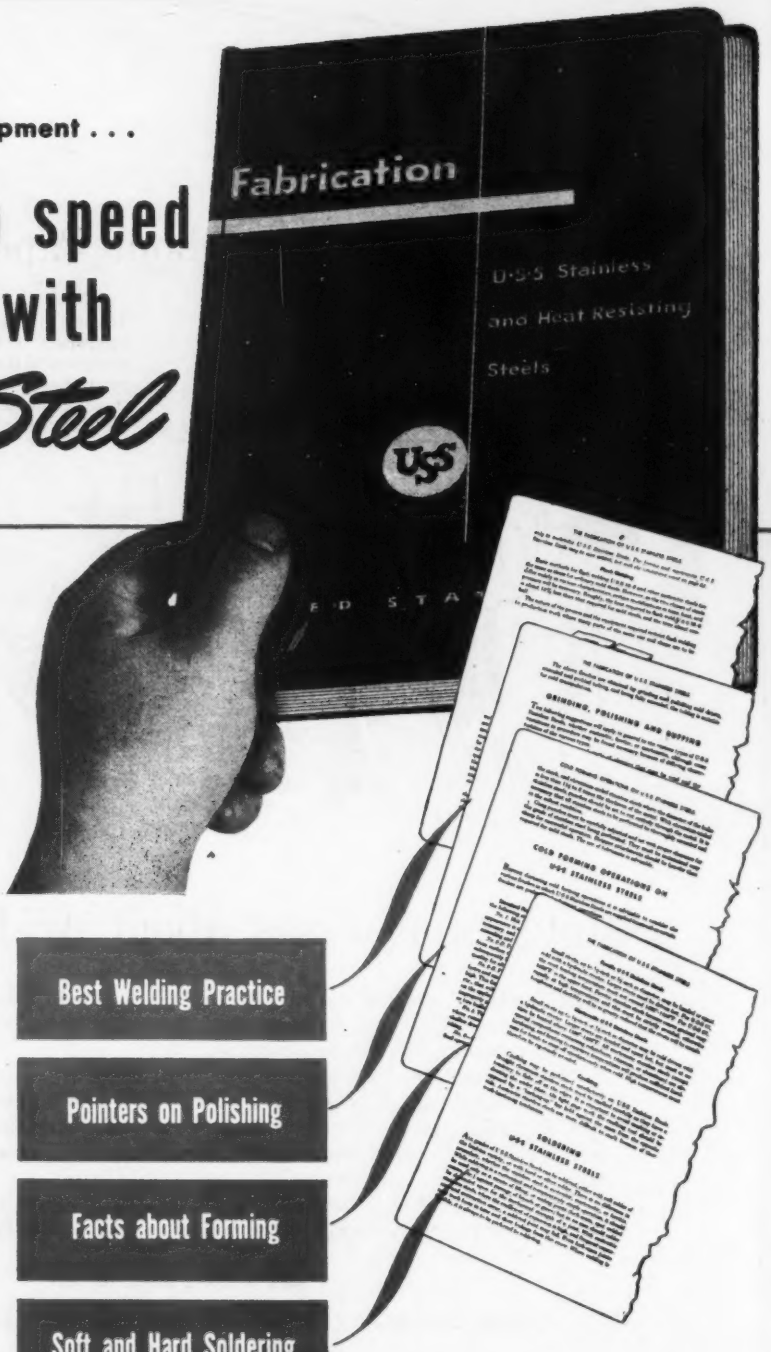
BOUND BROOK, NEW JERSEY

New York • Chicago • Philadelphia • Boston • Charlotte • Providence

Calco

If you are designing or building paper mill equipment . . .

Here's help to speed your work with *Stainless Steel*



SUCCESSFUL fabrication with Stainless Steel needs exact methods. But these methods are difficult only when operations are inordinately severe or where an unusual alloy has had to be selected to withstand unusually severe conditions. In over 99% of the cases, Stainless Steel fabrication is *not* difficult . . . it is just *different*.

In this authoritative textbook, just off the press, these differences in fabricating techniques are thoroughly discussed.

Here in practical form are assembled the very latest findings on Stainless Steel welding, riveting, soldering and joint design—on machining, cutting, forming, annealing and pickling —on surface finishing and protection.

Here are listed for handy reference the various U·S·S Stainless Steels we produce—their physical properties and chemical compositions— the forms and sizes in which they are available—their resistance to various reagents.

This book is FREE—send for your copy. Use it as a guide to successful workmanship. And when unusual conditions confront you, ask for the assistance of our Stainless Steel specialists.

Best Welding Practice

Pointers on Polishing

Facts about Forming

Soft and Hard Soldering

U·S·S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

We can supply U·S·S Chromium Nickel and Chromium Stainless Steel not only in many different analyses but in the widest, most complete range of forms, sizes and surfaces finishes anywhere obtainable. Our engineers are specialists in solving new and unusual problems in the use of Stainless.

UNITED STATES STEEL

NO CHECKMATE

When your move is to Stein-Hall

This is a problem in good chess. It is also a problem in good business. On the board, the white king is checked, but not **check-mated.** He can move out of danger.

In business, too, there are constant checks by shortages which must be licked by substitution or new production techniques. Helping our customers move out of these checks is our job.

Stein Hall technicians and field representatives know the problems of your business. They are plant wise and production wise. They have back of them Stein Hall's long experience and unsurpassed research facilities.

It will pay you to plan now to move out of check by calling on Stein Hall for advice and counsel.

80 YEARS OF SERVICE TO THE PAPER INDUSTRY

STEIN SH HALL

EST. 1866

285 MADISON AVENUE NEW YORK 17, N.Y.

OFFICES IN PRINCIPAL UNITED STATES CITIES AND AT 250 VAN DORN STREET, TORONTO, CANADA

LABORATORIES AT NEW YORK, CHARLOTTE, N.C., PROVIDENCE, R.I., CHICAGO

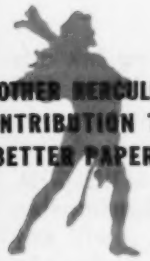
Founders-Stein-Hall Fellowship at the Institute of Paper Chemistry, Appleton, Wis.

THE SIZE YOU

IT PAYS TO KNOW *MORE* ABOUT

HERCULES

WANT *WHEN YOU WANT IT!*



For virtually any type of paper or paper product, Hercules has the size you want, *when you want it!* This service to papermakers, maintained consistently even throughout the war, stems from the fact that Hercules is the world's largest producer of rosin and rosin derivatives, and has at its command a thorough knowledge of rosin chemistry.

Hercules' wide range of sizing materials includes rosin sizes to meet the most diversified requirements. These sizes are available in three basic forms — dry, paste, and emulsion. Produced from a series of resins and modified resins, they can be tailor-made to meet practically every sizing need.

In addition, there are numerous Paracols* (wax and wax-resin emulsions) for sizing. Covering a wide range of compositions and properties, they impart special properties to the finished sheet.

Hercules Staybelite* size constitutes another useful development — when specialty papers are required which must be unusually bright, tasteless, and permanent.

If size or its application is important to you, why not let our technical representatives tell you about the many standard and specialty sizes made by Hercules.

*Reg. U. S. Pat. Off. by Hercules Powder Company

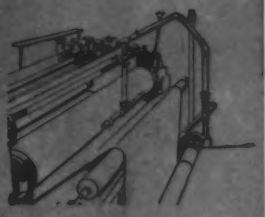
CHEMICAL MATERIALS FOR THE PAPER INDUSTRY

Hercules chemical materials for the paper industry include:

Staybelite* Esters...
Wax additives for coating and laminating processes, modifiers for GRS and Neoprene latices for impregnating and laminating paper and board stocks.

Hercolyn*...
A liquid resin for transparentizing. Possessing excellent fiber-wetting properties, it is useful for the production of transparent and translucent papers.

Chemical Cotton...
Hercules chemical cotton is a pure cellulose, in loose or sheet form. Cleanliness and brightness are outstanding.



Casein...
Hercules casein is used as the binder in clay-coatings, and as an adhesive in laminants and paper converting.

Paracols*...
Water-dispersible wax emulsions used to increase finish, flexibility, printability, and waterproofing of paper.

Chemicals...
These include sulphonated oils, foam killers, eveners, acids, alkalies, alum, and satin white.

*Reg. U. S. Pat. Off. by Hercules Powder Company

FOR FURTHER DETAILS

Papermakers Chemical Department
HERCULES POWDER COMPANY
INCORPORATED
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P-68

NO MATTER HOW YOU LOOK AT IT

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insure a perfect base for high gloss and full ink brilliance with KELGIN, the modern algin surface sizing agent.

controlled penetration of printing ink oils and waxes. KELGIN forms an ideal film barrier.

application is insured with KELGIN. It is ideal for water box application in the calender stacks . . . will not produce foaming, picking, sticking to the rolls. KELGIN is soluble in hot or cold water.

KELGIN provides a uniformly smooth, dense surface . . . increases gloss. It is economical—free of impurities—easy-to-use.

KELGIN

is a product of nature rigidly processed to produce exact uniformity of results. We will gladly help you solve your surface sizing problems. Our technical department is at your disposal.

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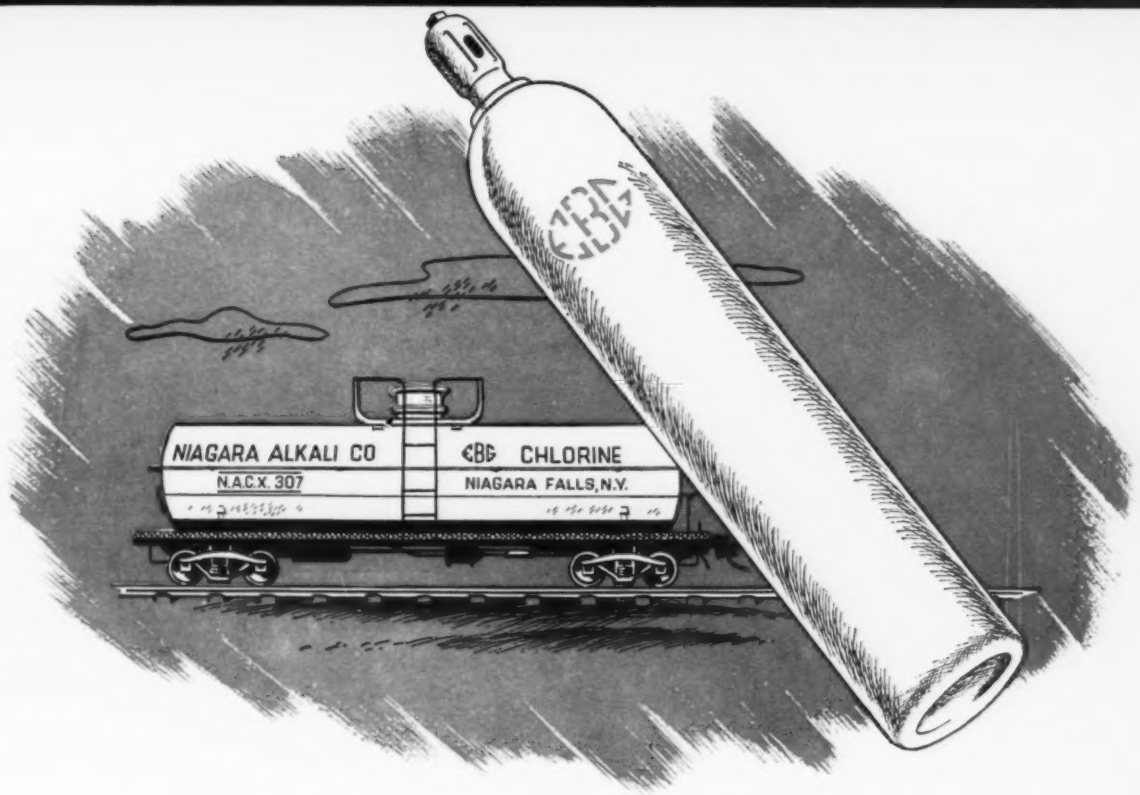

The importance

OF BEING NIAGARA EBG LIQUID CHLORINE

LIQUID CHLORINE continues to increase in importance not only as an agent for the purification of water and the bleaching of textiles, paper and other products but also as a convenient chemical "tool" for the development of new and useful organic compounds.

As the first American producer of this chemical and a pioneer in electrochemical product development, Niagara's service in Liquid Chlorine is backed by advanced knowledge and experience that can be of continuous value to you in obtaining the best results from its use.

A new 48-page booklet giving essential data on the uses, characteristics, physical properties and handling of Niagara EBG Liquid Chlorine is available on request. • • • Niagara Alkali Company, 60 East 42 Street, New York 17, N. Y.

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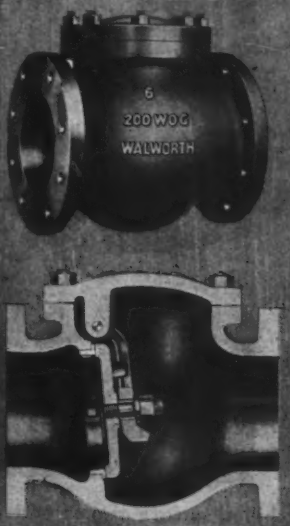
THE *Right* VALVES for pulp and paper mills

Walworth No. 725FS OS&Y, Flanged, Wedge Gate Valves are tough and wear-resistant. They are available in sizes 12 inches and smaller; 200 pounds non-shock service cold water, oil, and gas pressures. They are designed especially for the pulp and paper industry.



Walworth No. 928FS Swing Check Valves are recommended for use with No. 725FS . . . and like No. 725FS are designed to meet fully the requirements of the pulp and paper industry.

Both the Walworth No. 725FS OS&Y, Flanged, Wedge Gate Valve and No. 928FS Swing Check Valve were designed by Walworth engineers, in cooperation with paper mill engineers, with full consideration for the service to which pulp and paper mills would subject them. These valves, made of special alloys to defeat caustic corrosion, insure a long life of trouble-free service. No. 725FS's deep stuffing boxes eliminate leakage, and stainless steel stems, seat rings, and back seat bonnet bushings assure the utmost durability.

These two Walworth products are the last word in design, metallurgy, and construction. They round out the Walworth line of valves and maintain the Walworth policy: "The correct valve for any and every service."

For further information on these Walworth valves — and details on Walworth's complete line of valves and fittings — write on your company letterhead for a free copy of Catalog 42.

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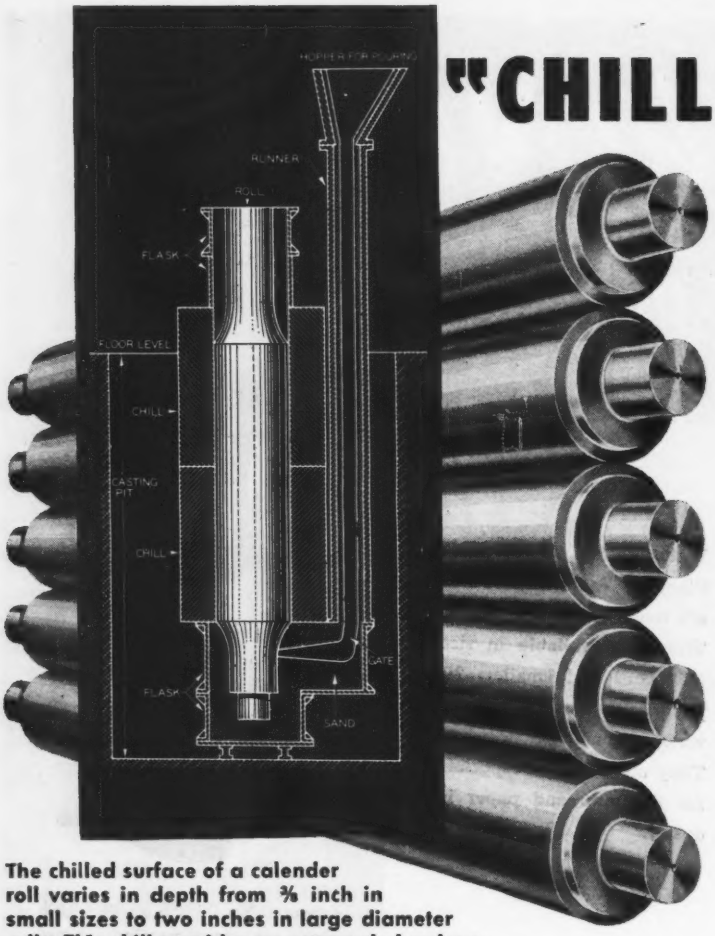

The chilled surface of a calender roll varies in depth from 3/8 inch in small sizes to two inches in large diameter rolls. This chill provides an extremely hard surface capable of taking and holding a smooth, mirror-like finish. The strength of a roll lies in the gray iron structure below the chill.

"CHILL CONTROL" gives Farrel rolls LONGER SERVICEABILITY

"Chill Control" is Farrel's proved ability to give every roll a clear, hard, chilled iron skin, *deep enough to provide maximum wear life* but not so deep as to detract from the strength of the roll.

Determining and controlling the correct relation between depth of chill and strength of roll requires a high degree of skill and experience. Farrel has accumulated this skill and experience over nearly a century of casting, machining and grinding thousands of different sizes and types of rolls in *America's largest specialty roll shop* at Ansonia.

To you, the roll user, Farrel's background of roll-making success is of dollars-and-cents importance, for it is your assurance that any roll you buy from Farrel will give the maximum amount of paper-making service.

When you need rolls or any of the other equipment listed here, call Farrel. Complete information and engineering help are yours for the asking, any time.

FB-318

FARREL PAPER MILL MACHINERY

ROLLS: Chilled Iron, Dry Sand, Meehanite, Alloy Iron, Steel, Chromium Plated
FOR: Calender Stacks
Board Calenders
Super Calenders
Glassine Calenders
Friction Rolls
Breaker Rolls
Smoothing Rolls
Coating Rolls
Creping Rolls
Plater Rolls
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Saturating Rolls
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Miscellaneous Special Purposes
CALENDERS: Paper and Board
GRINDING MACHINES: Roll
CALIPERS: Roll
GEARS, CUT: Spur, Single and Double Helical (Farrel-Sykes Continuous Tooth Type)
SPEED REDUCING GEAR UNITS
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PYRIDOSE effectively and economically controls paper mill slime. It starts to work at once.

PYRIDOSE is more rapidly effective because its active ingredient is 140 times more soluble than other comparable agents. It is *deadly to common slime-forming organisms, in concentrations of as little as 1 part per million.*

A handy one-ounce packet of Pyridose—thrown unopened into the beaters or refiners—starts the treatment immediately.

No stopping of machines . . . no waste of material. More information from your nearest Mallinckrodt office today.

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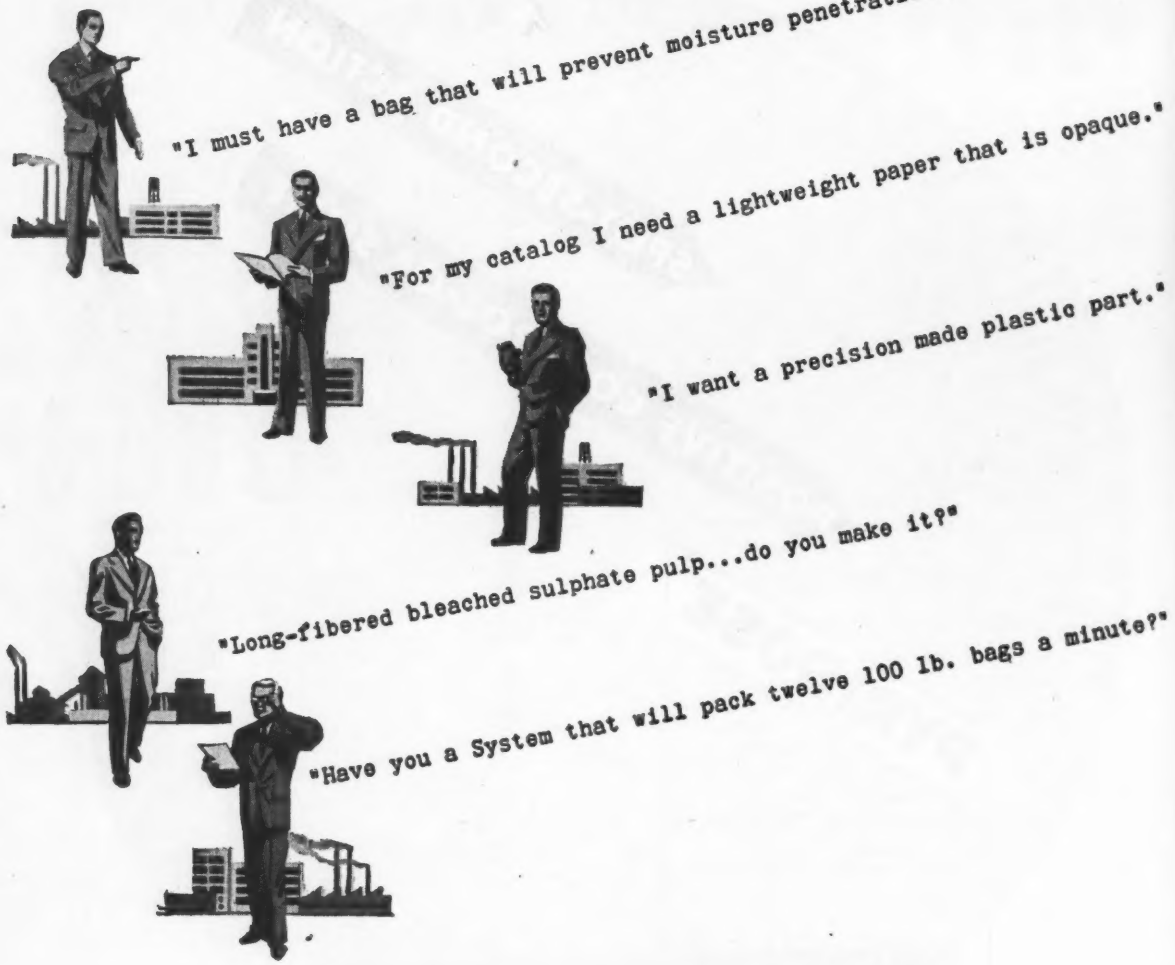
"I must have a bag that will prevent moisture penetration."
"For my catalog I need a lightweight paper that is opaque."
"I want a precision made plastic part."
"Long-fibered bleached sulphate pulp...do you make it?"
"Have you a System that will pack twelve 100 lb. bags a minute?"

ST. REGIS SERVES THEM ALL

St. Regis Paper Company can and does serve them all because we make a wide range of wood cellulose products.

In fact the growing demands of 21 basic industries, expanding to meet tomorrow's requirements, are reflected in a broad expansion program in all divisions of St. Regis.

"Tacoma" pulp . . . high grade, long-fibered, bleached and unbleached . . . is favored by paper manufacturers.

Magazine publishers, mail order houses and printers select St. Regis lightweight *groundwood papers* for their fine printing qualities and lack of "show through".

Manufacturers rely on St. Regis *multiwall paper bags* to protect their products in transit and in storage. More than 300 different products . . . chemicals, foods, building materials . . . are speedily and economically packed by St. Regis *Packaging Systems* (Packers and Valve Bags).

Panelyte plastics find wide use in the refrigeration, automotive, aviation and electrical industries.

Product and Market Research are moving apace with expansion of production facilities to enable us to maintain and improve our service to industrial America.

Your inquiry will receive prompt, careful attention from any one of the sales offices listed.

ST. REGIS PAPER *Company*

St. Regis Products are sold by St. Regis Sales Corporation: NEW YORK • CHICAGO • BALTIMORE • SAN FRANCISCO

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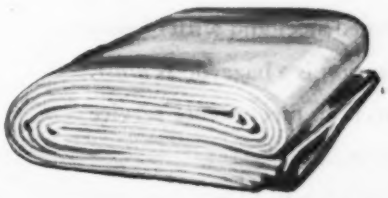
PRODUCTS: *St. Regis "Tacoma" bleached and unbleached sulphate pulp . . . Multiwall Bags and Bag-filling Machines . . . Printing, Publication and Specialty Papers . . . Panelyte — The St. Regis Structural Laminated Plastic.*

Put the ACCENT where it belongs

SUL*FIGHT*
SELL*ULOSE*
***PAY*PER**

No matter how you spell them, those words should always be accented as indicated. The *fighting* toughness and the *sellability* of your product govern the price your customers will *pay* for it . . . The speed and economy with which you convert pulp into paper or board govern your costs and your profits.



No matter what pulp you use — domestic or imported, straw, chip, ground wood, sulphite, sulphate or rag—you can make your product better, faster and at less cost by equipping your machines with Hamilton Felts. Better, because Hamilton Felts give stronger and smoother formation to your sheets. Faster, because Hamilton Felts remove more water per second at all speeds of the machine. At lower cost, because Hamilton Felts reduce the amount of steam that is necessary to complete drying.

• From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

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• **Miami Woolen Mills** •

Hamilton Felts

• **Established 1858** •

FOR STAMINA REQUIRED BY ENCLOSED GEAR SERVICE

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For speed reduction units—constructed of hardened steel and with closely fitted bearings—continuous, uninterrupted operation is a hazardous *must*. Make sure that *stamina*—built into speed reducers to meet severe service demands—is fostered by a *stamina-packed* lubricant.

Such a lubricant is Sinclair RUBILENE, precision-refined for sustained mechanical efficiency. RUBILENE flows freely to all closely fitted parts, provides protecting lubricating film at points of concentrated pressure on gear teeth, resists oxidation and resultant acid, gum and sludge formation.

Protect against wear, hold operating temperatures down, avoid oxidation, sludge, and clogged oil passages with Sinclair RUBILENE. Our lubrication engineers are prepared to show you how RUBILENE is adapted to *your* operating conditions for maximum efficiency.

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

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Do you want to make a *better product* at a *lower cost?*

Then look into

American Anode latices and mixes

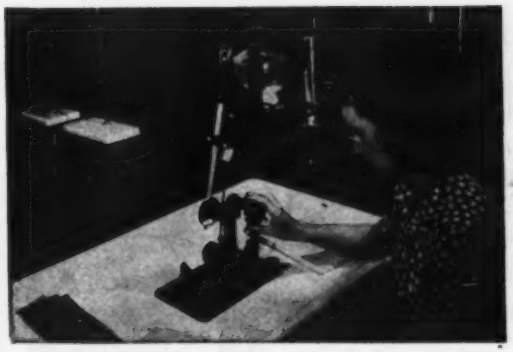
for coating and impregnating paper . . .

Without question, during the next few years the most important technical advances in the coating and impregnating of paper will be made possible by the use of American Anode latices and water mixes—*if* you will let us work with you on established products as well as new developments.

There has been so much recent progress in this field that it's doubtful if paper chemists and engineers have been able, in these busy days, to keep abreast of it.

There's ample evidence that in many cases we will be able to help you make a *better* product at a *lower* cost. Certainly, manufacturing will be simplified because water systems are inherently uncomplicated. They're materially safer, too; no dangerous explosive solvents; no cumbersome and expensive solvent recovery systems.

Latices and mixes of natural and synthetic rubbers, GEON, HYCAR, neoprene, and Saran are available from our bulk storage. For more information about the *modern* way to coat and impregnate paper, please write Department AD-11, American Anode, Inc., 60 Cherry St., Akron, O.



The American Anode laboratory in Akron is equipped with the latest and most modern paper testing equipment, and is staffed with people who know how to use it.

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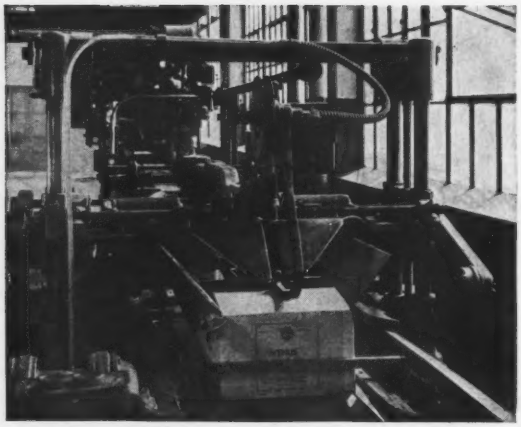
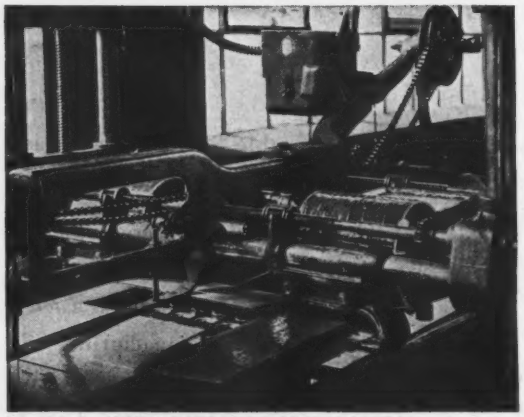
NATURAL AND SYNTHETIC RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS





"The adhesives we use MUST MATCH our own high standards"

WHIZ Venus Polish cleans and waxes your car in a single operation. It is one of the more than 500 quality products made by R. M. Hollingshead Corporation, Camden, N. J. —a company in which unusually high research standards are the rule.

"Having taken great pains to develop and maintain our quality, we are equally interested in seeing that our products are correctly packed for delivery to the consumer. The adhesives we use must match our own high standards. We have used Arabol in sealing WHIZ packing cases for several years, with excellent results." That is the testimonial Arabol received from the R. M. Hollingshead Corporation. We take great pride in our ability to meet such exacting requirements.

No matter how specialized your particular adhesive problem, you can count on Arabol to help you work it out. Perhaps the adhesive for you is among the 10,000 formulas on file in our laboratories. If not, we will develop it to meet your specifications.

For more than sixty years, we have produced specific adhesives to perform specific tasks. Today it is our privilege to serve the leaders in a hundred industries.

See the Arabol Representative when he calls; he knows adhesives.

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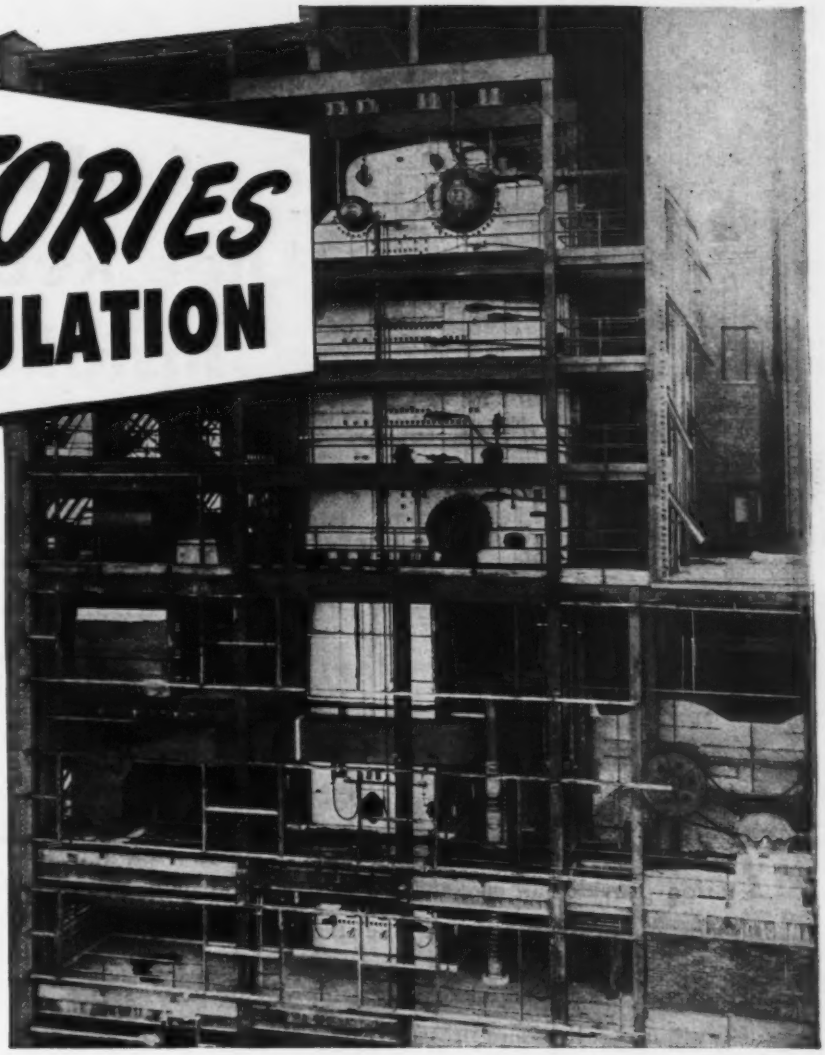
Adhesives?... ARABOL!

7 STORIES OF INSULATION



GIANT RECOVERY BOILER, for burning black liquor from digestor, recently installed by Combustion Engineering Co., New York, in large Southern paper mill. A Johns-Manville Technical Service Unit handled entire insulation job from specifications of materials to final application.

...another complex job handled efficiently by Johns-Manville Insulation Applicators

A complex job yes, but these two simple steps assure maximum fuel savings and operating efficiency.

The right insulation for every application

Your J-M Insulation Applicator selects the right materials for your job from the wide variety in the J-M insulation line.

Johns-Manville Insulation specialists, plus the facilities of the J-M Research Laboratory, are available to help you with your particular insulation problems, regardless of how complex they might be.

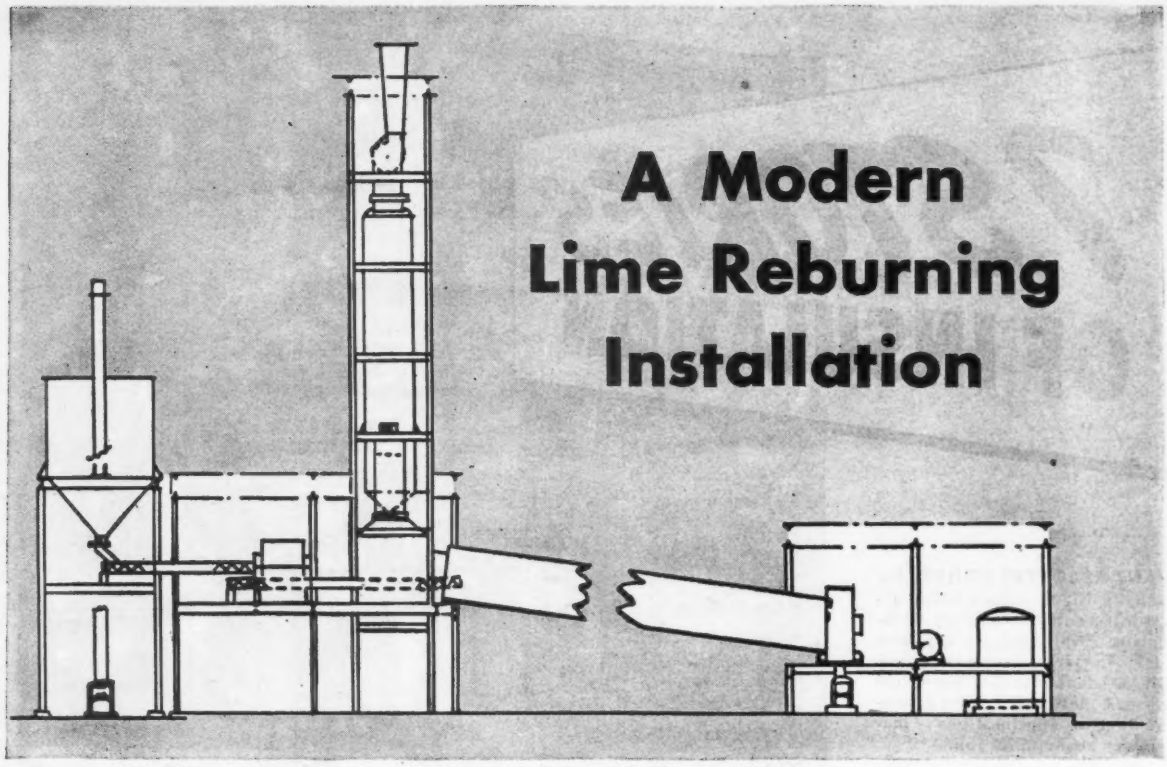
Expert application of the right insulation

J-M Insulation Applicators offer this double assurance of a completely efficient job: (1) They are trained in all phases of insulation application. (2) They employ skilled mechanics and the most up-to-date methods of application.

For further information see your nearest J-M Insulation Applicator or write Johns-Manville, Box 290, N.Y. 16, N.Y.

JOHNS-MANVILLE PRODUCTS

JOHNS-MANVILLE *First in* **INSULATIONS**



A Modern Lime Reburning Installation

THIS new General American Lime Reburning Installation provides an efficient low cost method of getting the most out of limestone and lime sludge.

A rugged motor-generator drive, an improved type air seal, easily aligned rollers and pressure oil system assure trouble-free mechanical operation.

Because all the units—kiln, filter, thickener, scrubber and bins—are built in General American's own shops, you secure the benefits of undivided responsibility for the satisfactory performance of the installation.

Ask for further information on how this new Lime Reburning Installation can improve your operating results.

EQUIPMENT FOR PULP AND PAPER MILLS

EVAPORATORS
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Today's *Hydraulic* Problems Are Solved by *Science!*

GUESSWORK, crude and makeshift methods in hydraulics are of the past. Now, problems are worked out in advance in our own Hydraulic Laboratories. By constant research the quality and performance of our products are thereby continually enhanced.

Also, by testing models of proposed installations including both intake and discharge passages in conjunction with turbines especially designed to meet the expected operating conditions, exact project efficiency and performance can be predicted. Alterations, if necessary, can hence be made prior to actual field construction or manufacture. Thus it is to your interest to make haste slowly in purchasing hydraulic equipment. Avail yourself of our 72 years of experience and knowledge—and be certain!

If It's Hydraulics—
Put It Up to Us!

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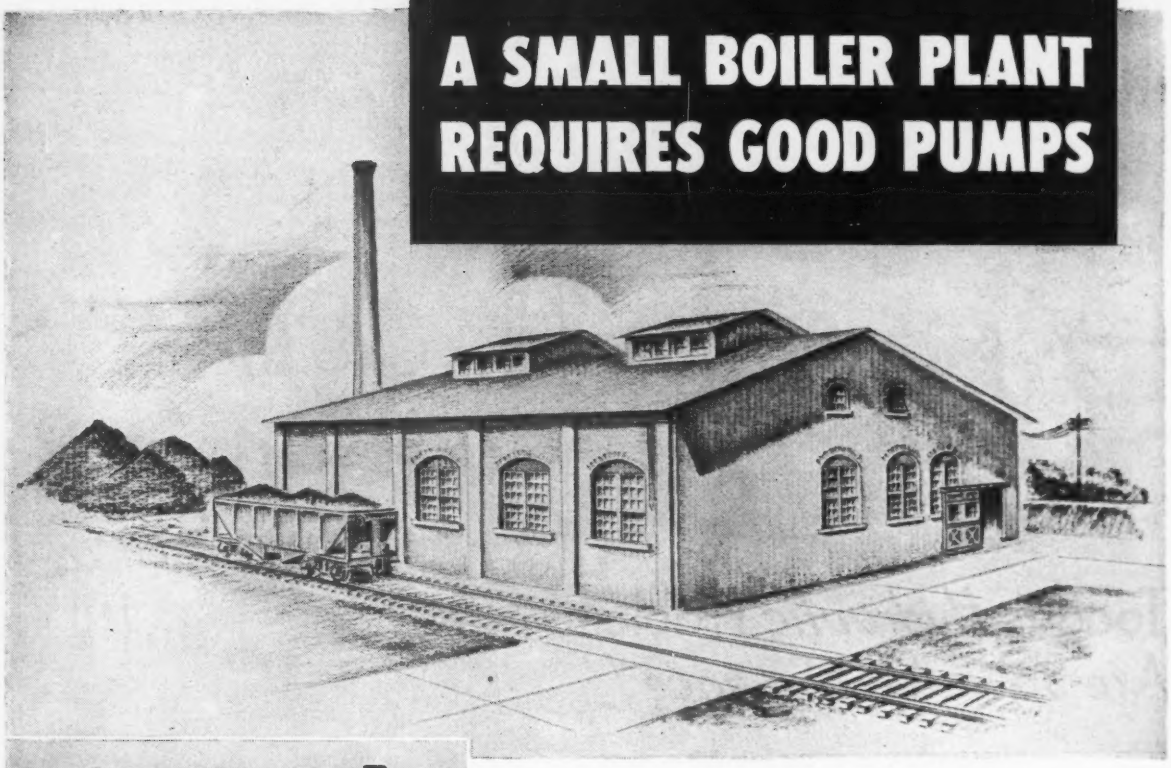
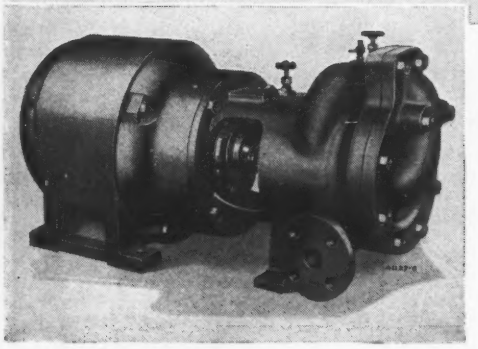
POWER *by* SMITH

A SMALL BOILER PLANT REQUIRES GOOD PUMPS





MRV 2-Stage Motorpump

Low operating costs and a minimum of maintenance are as important for the feed pump in a small boiler plant as in a large one. That's why Ingersoll-Rand centrifugal boiler-feed pumps for small plants are built with the same care as the well-known I-R units for large, high-pressure stations.

There is an efficient, dependable pump in the line for your plant . . . Two-stage pumps, four stage pumps, (yes, even 30 stages if you need that many). There are pumps that will deliver as little as 5 gal. per min., others for any capacity you may require.

Careful selection of materials, balanced impellers, rigid pump shafts, deep stuffing boxes, and other big-pump features, assure long life and freedom from trouble.

Ask the Ingersoll-Rand engineer near you for literature on a pump to fit your plant. Some of those that might fit your needs are:

MRV: 2-stage Motorpump, pressures up to 200 lbs, capacities to 275 gal per min.

MRVH: 4-stage Motorpump, pressures to 260 lbs, capacities to 50 gal per min.

GT: 2-stages; pressures to 450 lbs, capacities to 2200 gal per min.

CNT: 4 to 8 stages; pressures to 800 lbs, capacities to 700 gal per min.

All sizes can be furnished with motor or turbine drive

SEVENTY-FIFTH ANNIVERSARY

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CAMERON PUMP DIVISION

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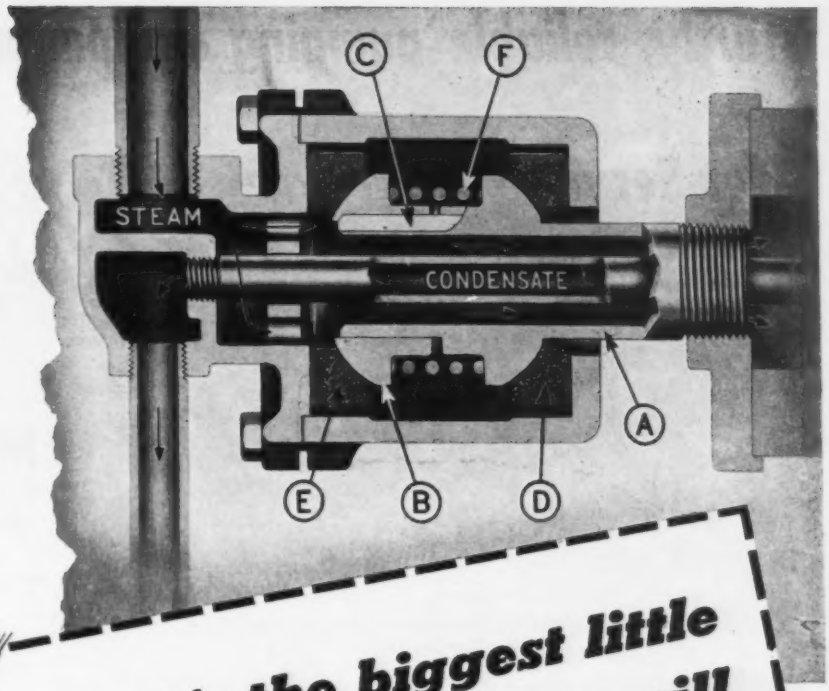


Nipple (A) is connected to roll or drum. Sliding collar (B) is keyed to nipple at (C), but slides loosely over it so pressure can fill entire housing. This pressure becomes the sealing force, by pressing seal ring (D) tightly against nipple. Both seal ring and bearing ring (E) are of special carbon-graphite, which eliminates oiling and packing. Spring (F) is for initial seating only. Type B Joint illustrated; other types, sizes for all needs.

....it's the biggest little trouble-saver in the mill

In terms of physical size alone, the Johnson Joint could hardly be called big machinery. But in its ability to save time and trouble, and promote plant efficiency, its stature approaches anything the industry has ever seen.

The Johnson Joint was designed to go after the old stuffing box and steam fit troubles in a business-like way, and it literally knocks the stuffing out of them. There's no packing of any kind. There's no oiling required, ever. There's no adjusting — the higher the pressure, the tighter the seal. There's little to fear from misalignment — with provision for both lateral and angular movement built right in. Note besides how neatly it provides for more efficient syphon drainage, through the same head that admits the steam.

In dollars and cents, what does all this add up to? Well . . . enough at least to pay the cost of switching over to Johnson Joints in just a short while. Enough certainly to make the Johnson Joint too big to overlook.

Write for literature and the name of your nearby Johnson representative.

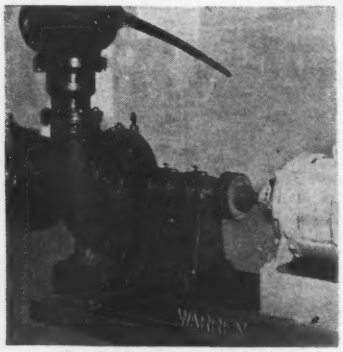
JOHNSON
Rotary Pressure
JOINTS

THE JOHNSON CORPORATION
828 WOOD STREET, THREE RIVERS, MICHIGAN

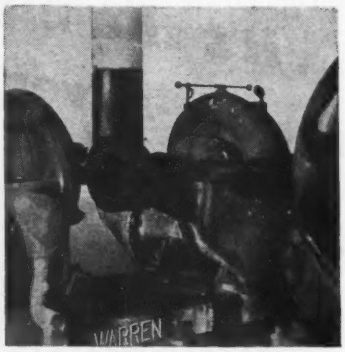
Sturdy, reliable pumping equipment for Service . . .

"Beyond the Call of Duty"

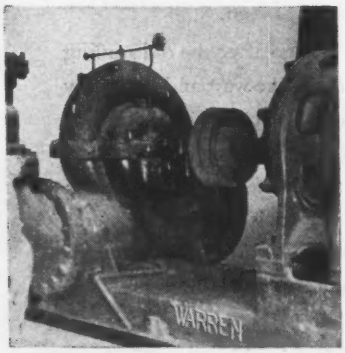
Here are four of over 50 Warren pumps that are in operation in a Southern Mill



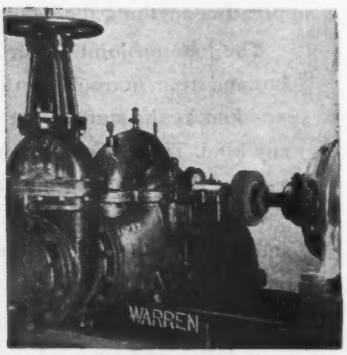
Pumping Stock to Head Box



Mill Water Supply Pump



Reservoir Supply Water Pump



Plant Fire Pump

MANY mills are turning to Warren for aid in modernizing their pumping equipment. Why?

. . . *Because* Warren can draw on a half century of highly specialized experience in the industry.

. . . *Because* Warren Pumps are known throughout the industry for efficient, reliable performance.

. . . *Because* Warren offers an engineered pump for almost every application—for handling pulp stocks, liquors in sulphite, soda and kraft mills, water for mill supply, showers, white water, wash-down, etc., for boiler feed and all power plant requirements.

There's a Warren representative near you. Why not discuss your problem with him and get his recommendation? Write

WARREN STEAM PUMP COMPANY, INC.
WARREN, MASSACHUSETTS

Atlanta Boston Chicago Cleveland Denver Detroit
Houston Hartford Los Angeles Minneapolis
New Orleans New York Philadelphia Pittsburgh
Richmond San Francisco Seattle St. Louis

PP-2

WARREN PUMPS

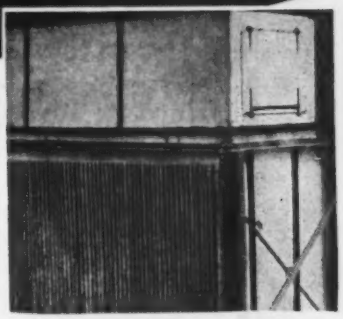
For Greater Dependability . . . Longer Life . . . Lower Maintenance

Stop Wasting Heat You Need

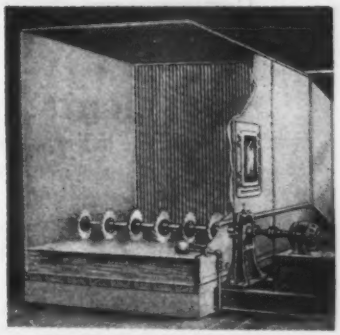
New Method Recovers Millions of B.T.U.'s From Heat Being Wasted

This modern Ross system, combining use of the Ross Briner Economizer with the Ross Scrubber, saves thousands of pounds of steam per ton of production by extracting heat from exhaust vapors. By this method either or both fresh water or white water is heated as well as exhaust air for maximum heat recovery. White water is heated first, then air by the economizer and finally the fresh water. This remarkable new heat recovery method is effecting saving of $1.00 and more per ton of paper produced. Installation of this system is practical even in the South.

Where less than maximum heat recovery is required it is possible to install any one or a combination of Ross Briner Economizer and fresh or white water heating equipment. Consult our engineering staff on your particular requirements.



View of Ross Briner Economizer



Cutaway view of Ross Scrubber

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORP.

DESIGNERS AND BUILDERS OF AIR PROCESSING SYSTEMS

350 MADISON AVE., NEW YORK 17, N. Y.

ROSS CONTROL OF AIR FOR MODERN INDUSTRY SYSTEMS

201 N. Wells St., Chicago-6 • 79 Milk St., Boston-9 • 12953 Greeley Ave., Detroit-3 • 1709 W. Eighth St., Los Angeles-14

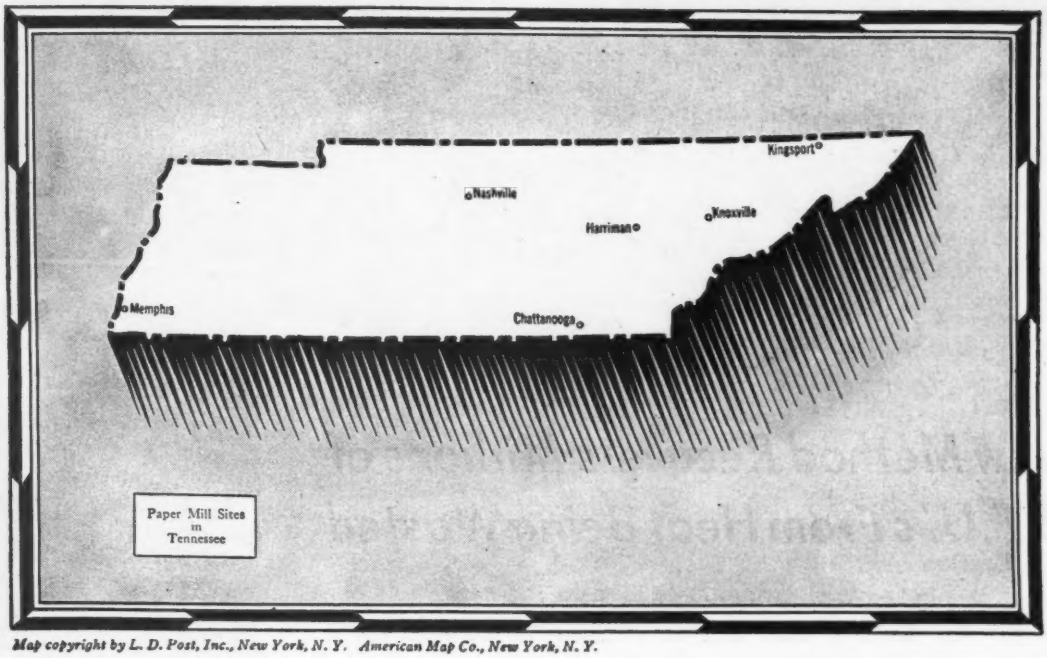
ROSS ENGINEERING OF CANADA, LIMITED — Dominion Square Building, MONTREAL, P. Q.

CARRIER — ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 23 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS



Map copyright by L. D. Post, Inc., New York, N. Y. American Map Co., New York, N. Y.

HIGH LIGHTS: Tennessee began papermaking at an early but uncertain date in the nineteenth century. The mill was set up by W. S. Whiteman four miles from Nashville, the equipment having been hauled by wagon from Philadelphia, where Whiteman had learned his trade as papermaker.

The State legislature passed bills both in 1809 and 1811, according to Weeks' *History of Paper Manufacture*, wherein it is also stated that although six mills existed in 1840, there were but two left by 1860.

There has, however, been a revival of pulp and papermaking in more recent times, with a notable growth in the production both of soda pulp and of chemical cotton pulp, which together exceed the production of paper and paperboard in this State. Book paper, chip and boxboard and roofing felt comprise the paper products of Tennessee, from six Fourdriniers and seven cylinder machines.

Draper Felts for Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

Canton, Massachusetts

RALPH E. BRIGGS Sales Manager

BRADFORD WEST, PITTSFIELD, MASS. • WILLIAM N. CONNOR Jr., CANTON, MASS. • L. H. BREYFOGLE, KALAMAZOO, MICH. • W. L. CAMPBELL, SAVANNAH, GA.

Wood's will take care of your group drive requirements from a stock of modern products, practical in design and expertly constructed from the best materials.

Efficient and dependable, backed by 89 years of specialization in the production of power transmission equipment, Wood's products give trouble-free operation and long service.

Pulleys for every purpose, both standard and special designs; bearings of every kind including solid and split journal type, pillow blocks, post and hanger bearings; compression and flexible couplings . . . whatever your needs, it will pay you to investigate the Wood's line.

Complete information supplied on request. Write us or contact your nearest Wood's distributor.

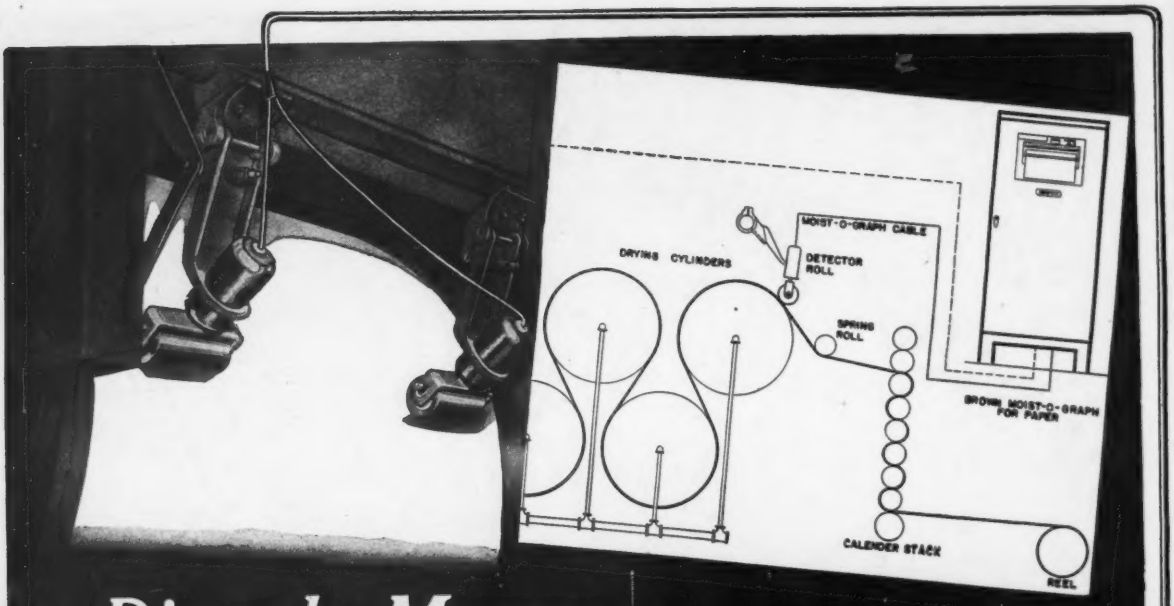
WOOD'S PRODUCTS
FOR POWER TRANSMISSION

Pulleys • Clutches • Hangers • Pillow Blocks
Couplings • Bearings • Collars
V-Belt Sheaves and Complete Drives

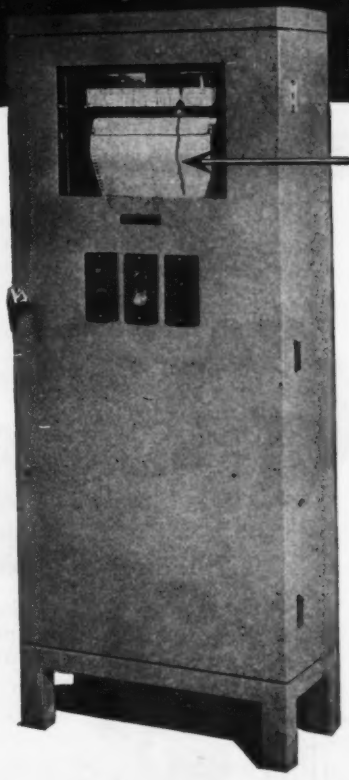
LONG LIFE LINE

T. B. WOOD'S SONS COMPANY, CHAMBERSBURG, PENNA.

BRANCHES BOSTON, MASS. NEWARK, N. J. PITTSBURGH, PA. CLEVELAND, OHIO DETROIT, MICH.



Directly Measures MOISTURE CONTENT *of Moving Sheet*



Imagine the economies and better quality possible by having an immediate indication and record of paper moisture content—as it goes from the drying cylinders to the calender stack.

The Brown Moist-O-Graph operating on the principle of measuring the electrical resistance through the moving sheet —provides immediate readings and automatic signals to operators when moisture content goes below or above set tolerances. The Moist-O-Graph tells what is happening at the moment. There is no waiting for laboratory reports. The instrument responds instantly to moisture changes acting as a positive guide to paper makers.

The Moist-O-Graph permits maximum amount of water to be held without discoloring or spoilage. Eliminates overdrying—increases production—lowers steam costs. Insures uniform quality, weight and caliper of stock.

Learn more about the Brown Moist-O-Graph system. Write for Bulletin 28-8. THE BROWN INSTRUMENT COMPANY, a division of Minneapolis-Honeywell Regulator Company, 4510 Wayne Avenue, Philadelphia 44, Pa. Offices in all principal cities.

Toronto, Canada
Stockholm, Sweden

London, England
Amsterdam, Holland

BROWN MOIST-O-GRAPH

TAKE WHITE WATER—Those pulp fibres it contains are valuable . . . far too valuable to waste. Indeed, to many a paper mill the water itself is precious, and must be recycled again and again.

The White Water Reclaimer, designed for the paper industry by Permutit,* not only recovers a high percentage of fibre and filler from this "waste" water, but permits re-use of the water.

TAKE PAPER QUALITY—Impurities in process water can mar the quality of your paper product . . . may mean rejects, with loss of profit and goodwill. Permutit Water Conditioning *removes* dirt, iron and other impurities from the water supply . . . gives you a cleaner, brighter sheet.

If you have a water problem, there's no better time to get after it than now, and no better way than Permutit Water Treatment. Modern, economical Permutit equipment gives the paper mill *complete control* of water quality.

Write for information to The Permutit Company, Dept. PT10, 330 West 42nd Street, New York 18, N. Y. or Permutit Co. of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

PERMUTIT

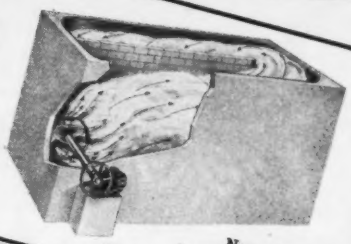
WATER CONDITIONING HEADQUARTERS

MURCO

Murray PAPERMILL and WOODROOM Equipment

BACKED BY THE EXPERIENCE OF OVER HALF A CENTURY

Here are some of the better-known Murray woodroom and papermill equipment items that for years have been serving the paper industry. Each machine has been improved as operating conditions demand more and more production, so that today they are machines designed and made to meet 1946 conditions. Complete details on any of the equipment shown here—or other woodroom or papermill equipment—will be sent you upon request.



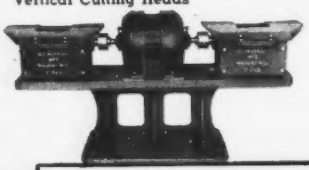
New Murco Axial Flow Agitator.

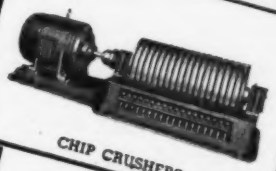
KNOT DRILLS

STAINLESS STEEL IMPROVED FLAT SCREEN

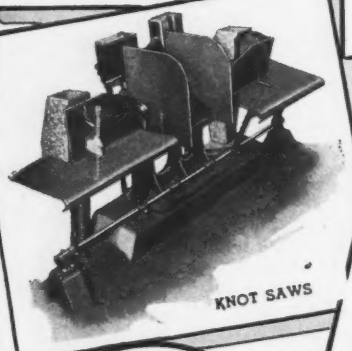
PULPWOOD SLASHERS

WOOD CLEANERS
Other models available with Vertical Cutting Heads



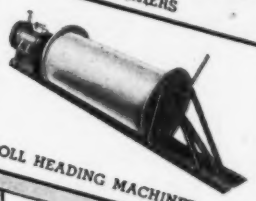


CHIP CRUSHERS



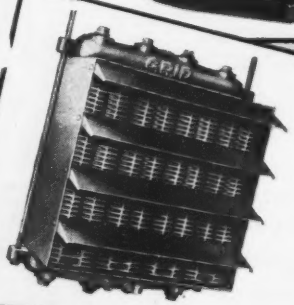
KNOT SAWS

PULPWOOD CHIPPERS



ROLL HEADING MACHINES

WINDERSHAFTS

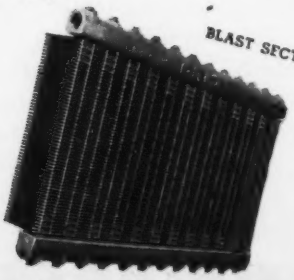


GRID UNIT HEATERS AND BLAST SECTIONS

High test cast iron heating sections — one piece construction; no soldered, brazed, welded or expanded connections — made to last longer than the other types of heating equipment.

UNIT HEATER

BLAST SECTIONS

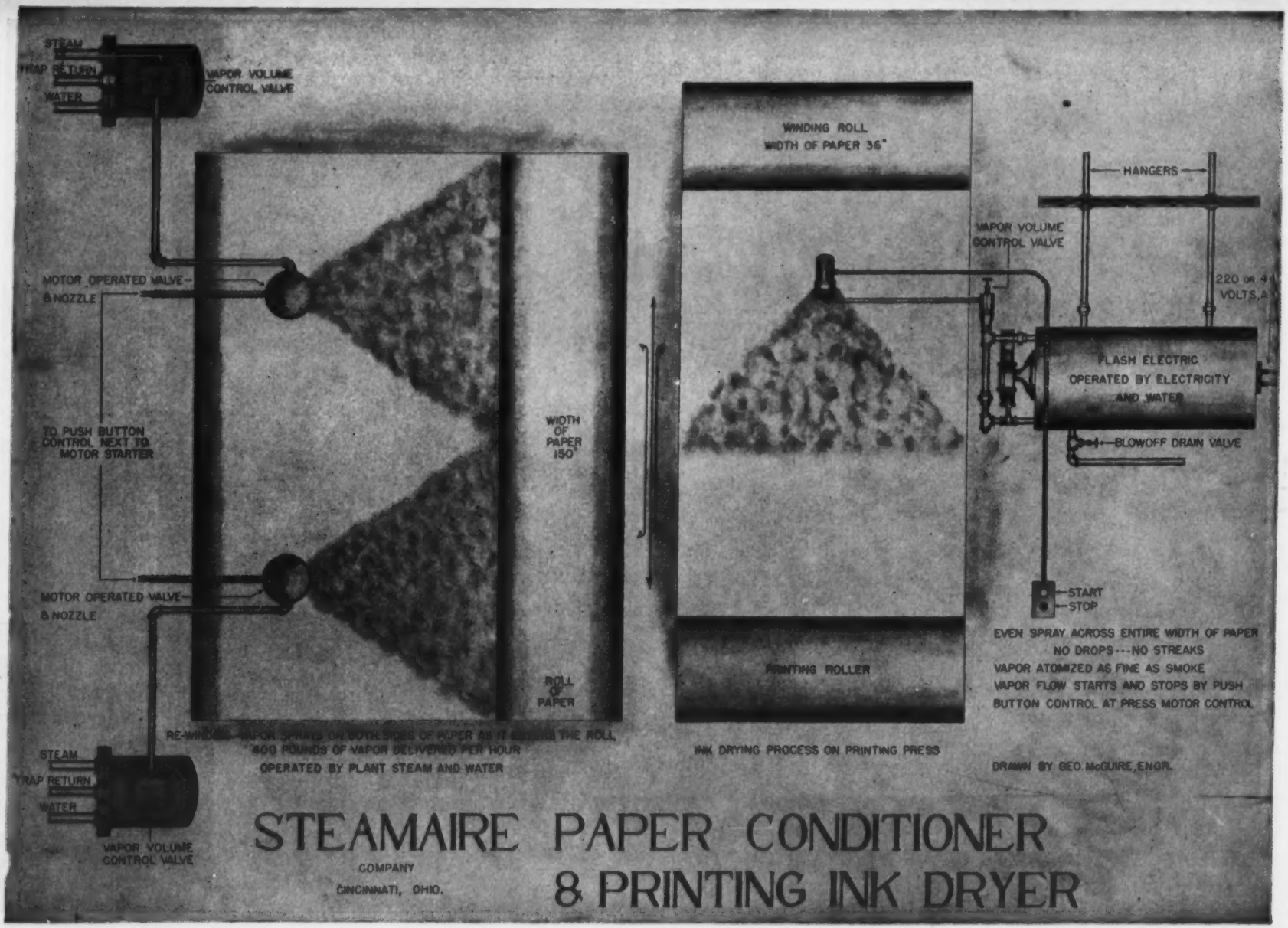


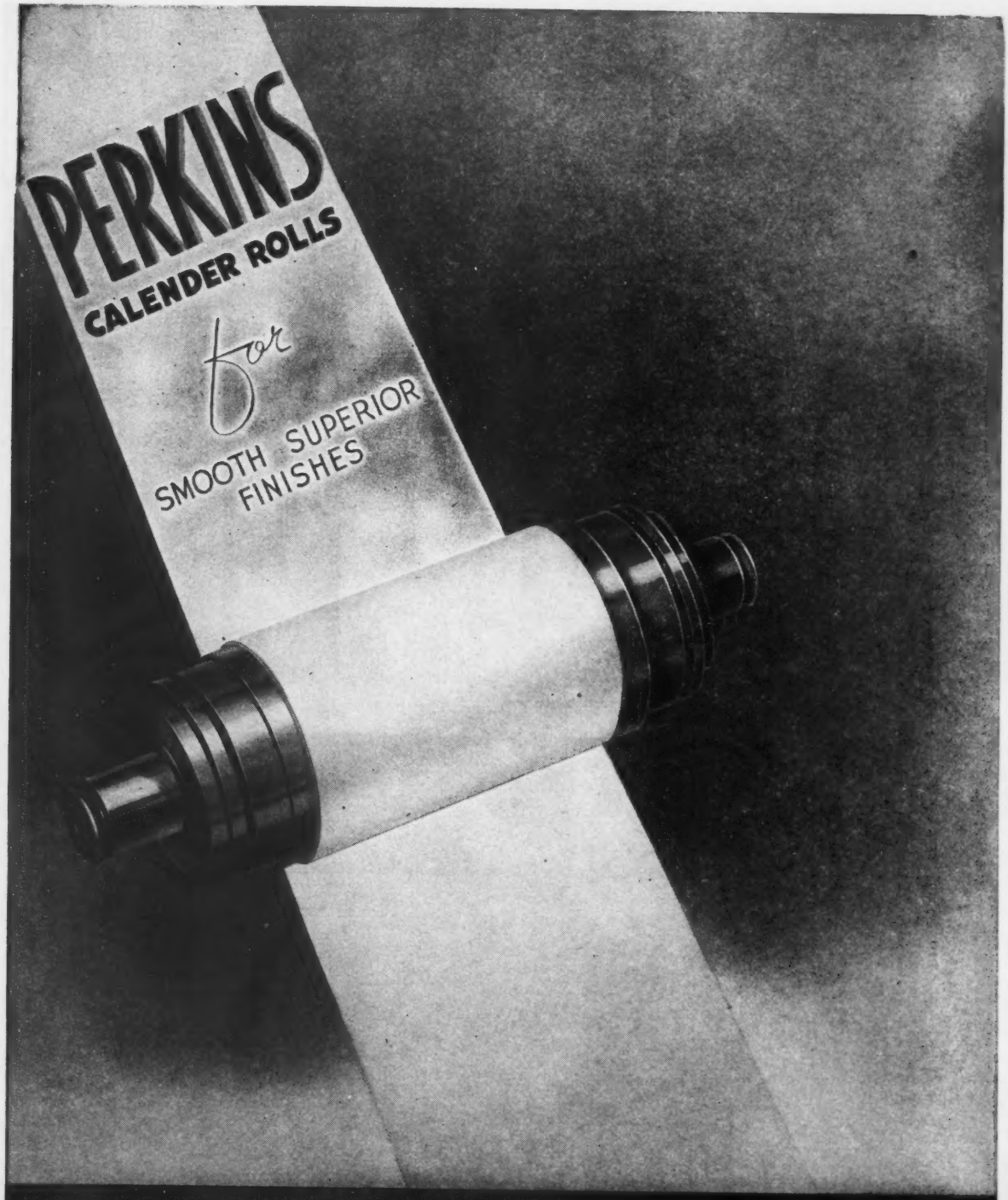
MULTIPLE KNIFE DISCS

"fin" sections made in one piece

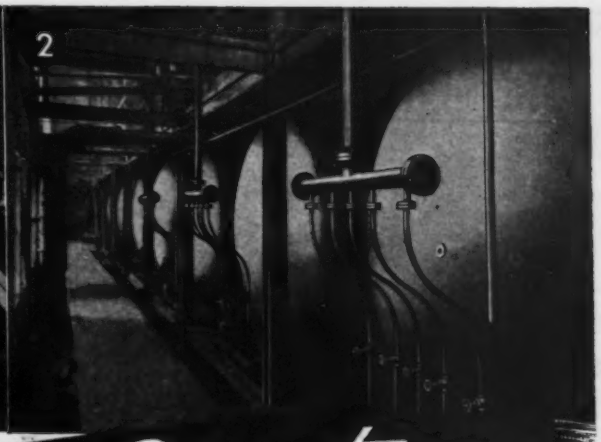
MURCO QUICK OPENING GATE VALVE

D. J. MURRAY MANUFACTURING CO.
WAUSAU WISCONSIN


STEAM
TRAP RETURN
WATER
VAPOR VOLUME CONTROL VALVE
MOTOR OPERATED VALVE & NOZZLE
TO PUSH BUTTON CONTROL NEXT TO MOTOR STARTER
MOTOR OPERATED VALVE & NOZZLE
WIDTH OF PAPER 150"
ROLL OF PAPER
STEAM
TRAP RETURN
WATER
VAPOR VOLUME CONTROL VALVE
RE-WINDING VAPOR SPRAYS ON BOTH SIDES OF PAPER AS IT LEAVES THE ROLL
400 POUNDS OF VAPOR DELIVERED PER HOUR
OPERATED BY PLANT STEAM AND WATER
WINDING ROLL
WIDTH OF PAPER 36"
PRINTING ROLLER
INK DRYING PROCESS ON PRINTING PRESS
HANGERS
VAPOR VOLUME CONTROL VALVE
220 OR 440 VOLTS, A.C.
FLASH ELECTRIC
OPERATED BY ELECTRICITY AND WATER
BLOWOFF DRAIN VALVE
START
STOP
EVEN SPRAY ACROSS ENTIRE WIDTH OF PAPER
NO DROPS---NO STREAKS
VAPOR ATOMIZED AS FINE AS SMOKE
VAPOR FLOW STARTS AND STOPS BY PUSH BUTTON CONTROL AT PRESS MOTOR CONTROL
DRAWN BY GEO. McGUIRE, ENGR.
STEAMAIRE PAPER CONDITIONER & PRINTING INK DRYER
COMPANY
CINCINNATI, OHIO.



B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASS.
THE LARGEST MANUFACTURERS OF ROLLS IN THE WORLD



The Biggs BOILER WORKS CO. AKRON OHIO U.S.A. EST 1867

Biggs Digesters . .

STANDARD EQUIPMENT FOR OVER 50 YEARS

Fig. 1—Biggs 14 ft. dia. welded rotary digester with worm-and-segment drive. *Fig. 2*—nine 14 ft. x 40 ft. sulphite digesters; weight, 65 tons each.

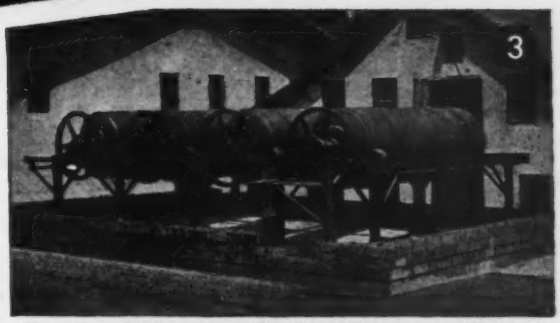


Fig. 3—cylinder rotary bleaching boilers available in all sizes and with various types of drives.

SINCE 1887 Biggs globe and cylinder rotary as well as stationary digesters have been universally used in the paper industry. These units are furnished in all sizes; are made from carbon or alloy steels for various working pressures with drives, linings and fittings to suit individual processes. Biggs "rotary boilers" are most versatile and economical in cooking, bleaching and otherwise processing a wide range of materials for standard and special operations. Units installed by Biggs in 1890 are still in daily operation with a minimum of maintenance. Biggs maintains a competent erecting organization. *Write for Bulletin 45.*

Biggs' modern plant facilities permit the fabrication of pressure vessels, welded tanks, pipe lines, stacks and other types of plate work.

Fig. 4—laboratory digester 8"x 18" with chain drive; working pressure, 250 lbs. Can be had in various sizes.

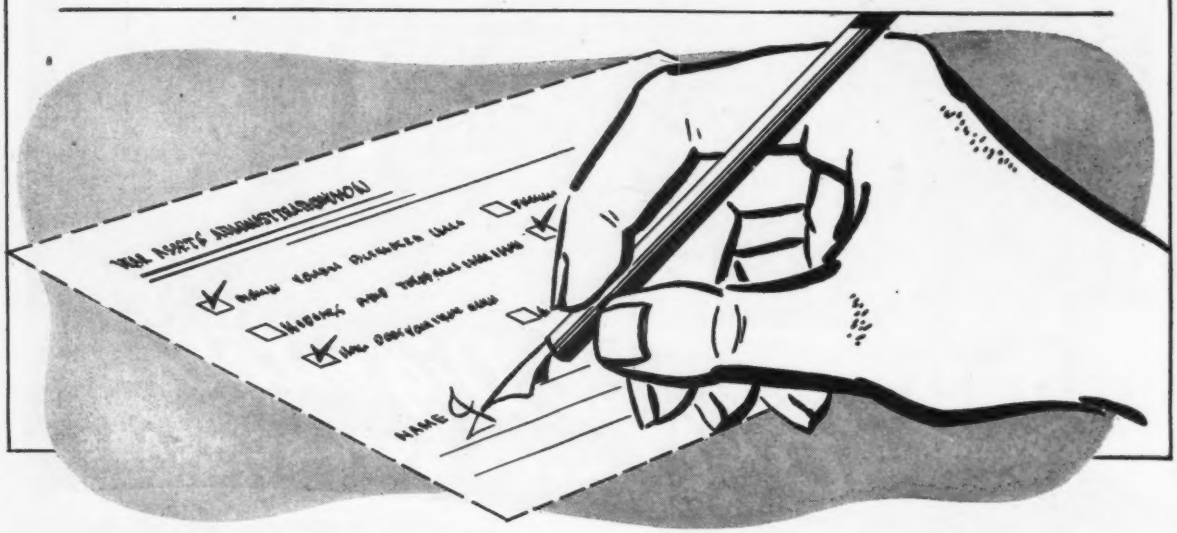
Fig. 5—experimental rotary digester made of nickel-clad steel. Units available in sizes from 30" to 72" dia. for various working pressures; fittings as required. →

BIGGS-WELD — STRONGER THAN THE PLATE ITSELF

THE Biggs BOILER WORKS CO.

1012 BANK STREET • AKRON 5, OHIO, U.S.A.

..GOVERNMENT-OWNED SURPLUS PROPERTY..



How to Locate Short Supply and Special Items of

INDUSTRIAL CHEMICALS

IF you need hard-to-get industrial chemicals, why not contact your War Assets Administration Regional Office? If what you are looking for is not in local supply, the WAA has set up a special Inter-Regional Sales Division to help find it for you—*quickly*—if it is available anywhere in the country.

Remember, there are hundreds of items in the vast stock pile of War Surplus industrial chemicals, many *at below-market prices!* Among them you may find the chemicals *you* want. All items are ready for quick sale and you may arrange convenient credit terms. Your nearest WAA Regional Office is listed below. Write today—or use the coupon below.

ONCE-IN-A-LIFETIME BUYS!

Acids	Calcium chloride
Gas cylinders (all types)	Dimethylaniline
Dyes and intermediates	Coal-tar
Plastic materials	Borax and boric acid
Solvents	Metal salts, oxide and hydroxides
Sealing and caulking compounds	Pitches Gases
Zinc carbonate	Rubber processing chemicals
Picric acid	Copper naphthenate
Welding fluxes	Synthetic & natural glues
Detergents and cleaners	Printing inks (black & colors)
Water treating compounds	and most other chemicals

33 REGIONAL OFFICES TO SERVE YOU

FREE FACTS

War Assets Administration (address nearest Regional Office)

Please supply without obligation, prices, available quantities and locations of items written in below:

.....

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.....

.....
(Describe item wanted)

Name.....Tel. No.....

Firm.....

Address.....

City.....State.....

155-5

All chemicals are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

Much surplus property is available to the export market. Merchandise in short supply is withheld from export, and if such items appear in this advertisement they will be so identified by an asterisk.

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

Specially designed
for paper machine
DRYER DRAINAGE SERVICE

QUICK FACTS

- **SPECIAL DESIGN.** Armstrong has designed a trap to meet the special requirements of draining individual paper machine dryers.
- **BIG AIR HANDLING CAPACITY.** Vents air from cold dryers; continues to purge air from hot dryers.
- **FACILITATES PRESSURE CONTROL.** Provides a definite stopping point for live steam; permits accurate control of steam pressure (and temperature) in each dryer.
- **TROUBLE-FREE PERFORMANCE.** Very simple construction. All stainless steel mechanism of same design and construction used in forged steel traps for 1500 p.s.i. and 900° F.
- **LONG LIFE—LOW MAINTENANCE.** Where ordinary traps wear out rapidly on paper machine service, the specially designed Armstrong trap has demonstrated ability to stay on the job with no more maintenance than for ordinary service.

Engineering Service . . . Armstrong Machine Works specializes in solving paper machine drainage . . . pressure control . . . temperature control . . . and sheet moisture control problems. If you have a special problem, check with Armstrong for an efficient economical solution. If you need modern, efficient drainage, use Armstrong paper machine traps.

ARMSTRONG MACHINE WORKS
813 Hoffman St., Three Rivers, Michigan

Inverted Bucket Steam Traps for Every Paper Mill Requirement

ARMSTRONG STEAM TRAP

Dryer Drainage System Trapping and Engineering

PAPER · · · America's 6th Industry

WASH CLOTHS MADE OF PAPER

(NEWS ITEM: *Twenty hotels are now supplying guests with individual wash cloths made of paper.*)

Wash cloths made of paper are finding a ready market in America's leading hotels. Every room is supplied with soft and gentle wash cloths at a considerable reduction in overhead. And there is no laundering expense.

This new paper is being used in homes for washing dishes, washing windows, washing enamelware and electric stoves, waxing floors and even for back-rubs. It is unaffected by boiling water. Perforations in the cloth help to increase suds and prevent a squirting effect when squeezed.

Paper sheets and pillow cases . . . paper draperies . . . paper covered steel core . . . paper tape for recording sound . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Among the new machines under construction by Puseyjones are three of the largest and fastest Fourdrinier Machines, one for book and high grade printing papers, one for white paper for bags, and one for Kraft liner board; also one Cylinder machine of record size and speed for the manufacture of floor covering felt. Other machines are under construction for the manufacture of M. G. Kraft specialties, facial tissues, and high grade bristols.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

PAPER TRADE JOURNAL
Vol. 123, No. 15 October 10, 1946
Title Reg. U. S. Pat. Off.

Twin Meetings Launch TAPPI On Busy Autumn Program

Detroit Meeting Considers Pulpwood Demand and Supply

The first of three 1946 fall meetings of the Technical Association of the Pulp and Paper Industry was held at Detroit, Mich., on September 26-28. About 250 attended. Harry F. Lewis of the Institute of Paper Chemistry was chairman of the Program Committee and organized a program devoted to the economic status of the pulpwood situation, and a consideration of the future possibilities relative to wood utilization for the manufacture of pulp and byproducts.

General and Business Session

The opening session was presided over by G. W. E. Nicholson of the Union Bag & Paper Corporation, and president of the Technical Association. He called upon the secretary, R. G. Macdonald to read the proposed amendments to the Associations Constitution which created a new class of members to be indicated as overseas members and rearranged the dates relative to handling the nominations for officers and time of balloting. These were approved by the members present who constituted a quorum.

Dr. Ruth Shallcross of the Institute of Paper Chemistry presented an interesting paper on "Some Economic Aspects of the Pulpwood Situation." Dr. Shallcross is an economist and at the conclusion of an exhaustive analysis of the present and future requirements of the industry said: "To the extent that the leadership of management, coupled with that of technical and operating men to make more efficient the methods of pro-

(Continued on page 116)

GUNNAR W. E. NICHOLSON
Presides at TAPPI Conventions

Engineering Holds Interest of Milwaukee Conference

About 300 representative engineers of pulp and paper mills of the United States and Canada, with a few visitors from Finland and the Scandinavian countries attended the First Engineering Conference of the Technical Association of the Pulp and Paper Industry at the Hotel Pfister, Milwaukee, Wisconsin.

E. F. Burns, Chief Engineer of the International Paper Company, New York, N. Y. was general chairman and was assisted in organizing the program by the chairmen of the committees of the Engineering Division of TAPPI. These included Milton Jacobs, Chas. T. Main Company, Boston, Mass.; G. R. Wadleigh, Hastings-on-Hudson, N. Y.; John E. A. Warner, Robert Gair Company, New York, N. Y.; Paul D. Corning, West Virginia Pulp and Paper Company, Mechanicville, N. Y.; A. E. Montgomery, J. O. Ross Engineering Company, Chicago, Ill.; and R. W. Porter, Chemical & Metallurgical Engineering, New York, N. Y.

The opening session on Wednesday morning, October 2nd, was devoted to committee reports by the above mentioned committee chairmen. The committees reporting included the following: Mill Design and Economic Aspects; Mill Maintenance and Materials; Materials Handling; Mill Instrument Control; Drying and Ventilating; and Steam and Power.

Following the luncheon at which R. G. Macdonald, Secretary of the Association presided, a session was held that was devoted to Mill Maintenance and Materials. Paul F. Corning presided as chairman.

E. D. Beachler of the Beloit Iron

Works presented a paper on "Paper Machine Maintenance" in which he pointed out the details of preventive maintenance of each part of the fourdrinier machine. Special emphasis was given to the consideration of proper lubrication to protect bearings.

George H. Pringle of the Mead Corporation, Chillicothe, Ohio, discussed "The Organization and Functioning of the Maintenance Department." This paper was formally reviewed by E. F. Burns of the International Paper Company. Mr. Pringle indicated that the maintenance department should be organized under the supervision of the plant engineer instead of the general superintendent and placed under the direction of a maintenance superintendent. The master mechanic, a qualified practical man who is experienced in all phases of pulp and paper mill repairs and is capable of handling men, works directly under the maintenance superintendent.

In addition to the usual repair groups, such as the machine shop, blacksmith shop, millwrights, carpenters, etc., there should be an instrument department, which is responsible for the installations, servicing, and maintenance of all instruments, and a lubrication department.

Records covering all phases of the maintenance department are necessary for the proper functioning of other related sections such as accounting and stores.

Work to be done should be clearly specified and a record kept by a dispatcher so that all concerned are kept informed.

William McIntosh of the Union Bag & Paper Company, Savannah, Ga., reported on Kraft Mill Maintenance and his paper was discussed by Paul West of the Thilmany Pulp & Paper Company, Kaukauna, Wis. Mr. McIntosh stated that maintenance in a kraft mill is fundamentally the same as in any other pulp and paper mill; the principal difference being in that materials are used which will withstand the alkaline liquors.

Adequate water lubrication materially increases the life of wood conveyors but care must be taken not to wet the bark so much that its fuel value is reduced.

Corroded digesters can be built up by welding and the use of marking sticks that will indicate the temperature during the preheating operation are most useful. Because of cost, stainless clad digesters are not known to be in use at the present time.

Stainless steel tubes have been installed in evaporators and have been found to be very satisfactory, however, a stainless clad tube sheet must be installed when the tubes are put in, otherwise, the tube sheet will fail in a few years.

Various alloys are most useful in such items as blow valves, diffuser bottoms, pulp washers, pumps, valves, and piping. The first cost is higher but their use definitely reduces repair costs and inconveniences caused by shutdowns.

R. G. MACDONALD
TAPPI Secretary-Treasurer

F. R. Forrest and H. Kingsbury of the Allis-Chalmers Company, Milwaukee, Wis., presented a useful set of rules dealing with "Pump Maintenance." This presentation was illustrated with cartoons that showed the important steps to take in maintaining pump in good condition.

K. Chamberlain of the Gates Engineering Company, Wilmington, Del., discussed "Corrosion Prevention." Three products used to prevent corrosion were described. Liquid Neoprene is a material that handles almost all acids, alkalies, and many solvents at temperatures of from —58 to 250°F. It can be painted, flowed, rolled, or dipped to all irregular-shaped surfaces, giving a smooth coating, or can be applied in a sheet form, to such equipment as rectifier rolls, stick pumps, suction box covers, tanks, and head boxes. Nitrocote was developed to withstand the action of nitric acid, bleaches, and solvents. Durofilm is an air drying protective coating used to advantage on structural work and for lining concrete beaters and stock chests.

A new development in the rubber lined pipe industry is a rubber lined pipe joint. Previously it was necessary to precut pipe and attach flanges according to the specification of a particular installation after which the rubber lining was applied. The advantage of the new joint is that standard supplies can be ordered and any necessary cutting or fitting can be done at the mill. This will eliminate the necessity of much of the engineering previously required and the use of welded flange pipe and fittings so that rubber-lined pipe can be carried as a regular stockroom item.

Dinner Program

Preceding the dinner W. Irving Osborne, Jr., President of the National Paperboard Association, the Cornell Wood Products Company and the Hummel & Downing Company was host to the Association at a very fine cocktail party.

G. W. E. Nicholson, President of TAPPI and Vice President of the Union Bag & Paper Corporation presided as General Chairman. Following the introduction of guests at the head table which included the chairmen of the Engineering Division Committees, L. V. Forman, Chairman of the TAPPI Lake States Section; Harold Falk, President of the Falk Corporation, and E. H. Brown, Vice President in charge of engineering and development of the Allis-Chalmers Mfg. Company, Mr. Nicholson called on E. H. Neese, President of the Beloit Iron Works, who extended an invitation to visit Beloit on Thursday. W. Irving Osborne, Jr., representing the paper industry in Wisconsin expressed his enthusiastic endorsement of the purpose of the Engineering Conference and welcomed those present.

W. C. Johnson, Executive Vice President of Allis-Chalmers extended an invitation to all to visit his plant.

Ken Haagenson, Director of Public Relations for Allis-Chalmers lightened the tempo of the meeting with some of his famous anecdotes and presented the speaker of the evening, Jack T. Wilson, Physicist for Allis-Chalmers who talked on "Industrial Applications of Radioactive Materials." Although Dr. Wilson's talk was necessarily somewhat beyond the scope of those present it was the clearest presentation possible of such an advanced subject. Among other things he indicated that the Manhattan District Project of the U. S. War Department has established an advisory committee on isotopes distribution policy. Recommendations have been made by this committee for the establishment of means by which institutions, industries, and research organizations may obtain radioactive materials which have been produced in chain reacting nuclear energy piles.

The radioactive elements which have utilized in research projects and the relative efficiency of various productive methods of these elements have been listed.

A survey is given of the possibilities of using radio materials in large scale industrial production and processing. Radioactive tracers have been employed in some industrial chemical processes as well as experimentally in biology and medicine.

Mr. Nicholson closed the program with interesting comments relative to his recent visit to the Scandinavian countries.

Steam and Power Session

J. E. A. Warner presided at the Steam and Power Session on Thursday morning. The first paper was presented by Steven Senko of the Personal Products Company, Miltown, N. J. This was entitled "The Supertherm System of Steam Generation." Briefly, Mr. Senko stated: "high pressure hot water is drawn at steam saturation from any industrial boiler of standard make and

is circulated through a completely closed pipe system by means of a pump of special design. The water is returned directly to the boiler after supplying the required British thermal units to the heat consumers. No traps, pressure reducers, or separators are used. The mains are welded throughout and radiation is the only loss which occurs. The efficiency of the heat transporting mains for water compared to steam is often increased 10 to 20%.

"No make-up water is required, consequently, no major scale deposits will accumulate, the water level in the boiler remains constant, and water treatment becomes a secondary factor.

"The power plant consists of two boilers, each rated at 43,300,000 B.t.u. at 200% rating. There are three mains; a 10-inch rated at 110,000,000 B.t.u. per hour, 8-inch rated at 64,000,000 B.t.u., and a 5-inch rated at 19,000,000 B.t.u. All are based on a 80°F. drop. For a 7-month period the average boiler efficiency was 84.69% with a fuel cost of 36 cents per million B.t.u. Other fixed charges bring the cost up to 62.5 cents.

"In addition to the installation of the supertherm heating system, a water treating plant has been installed at Milltown. Water for process and sanitary purposes is passed through a filter plant consisting of accelerator, sand filters, and water softeners."

Next followed an interesting paper by Arnold Urban of the Marathon Corporation, Rothschild, Wis., on his "Experiences With a Spreader Stoker Installation." In this paper Mr. Urban pointed out that the main boiler plant at the Rothschild plant of the Marathon Corporation consists of four 390 hp. four-drum bent tube boilers, one 600 hp. four-drum bent tube boiler, and one 871 hp. straight-tube cross drum boiler as well as six Scotch marine boilers which ordinarily burn wood refuse and are held as a standby. Because hydro power is usually adequate there has been no justification for the installation of high pressure boilers.

Originally the boilers were equipped with underfeed stokers but now all firing is done by overfeed stokers which are capable of burning most coals of characteristics from hard coal screenings and coke breeze to high or low volatile, high or low ash fusion point coals. Reclaimed sulphite waste liquor has also been burned on them.

In addition to closing up the condensate return system a continuous blowdown system was installed which resulted in cleaner boilers, drier steam, a saving on water treating chemicals, and a 2 to 2.5% saving on coal.

Fly ash is collected by an arrestor which is installed inside the chimney; there are no moving parts and no power is required. The ash is returned to the boilers and burned.

Because of considerable leakage in the conventional type of breaching dampers caused by twisting, warping, and setting of the breaching, the dampers were replaced with a type of roller curtain damper. These are simple in design and are held in place against the sealing strips by the draft; it may be rolled open as desired. About 200 hp. additional capacity and 50°F. increase in the temperature of the gases entering the economizer were obtained.

Superchargers were investigated and it was found that they substantially increased steam production and efficiency. They introduce high pressure air to the furnace through a series of manifolds and nozzles so that complete combustion is obtained almost instantaneously. Before the supercharger installation the peak load rating was about 240% of normal. It was raised to about 290%.

The superchargers saved about 3% on fuel, reduced clinkering on the grates and furnace walls, reduced the amount of fly ash by about 50%, and increased the burning rate of fuel per square foot of grate area.

The mechanical and control equipment must be given proper attention so that they are kept in good condition if the most efficient boiler operation is to be obtained.

F. M. Swengel of Laramore & Douglas, Chicago, Ill., presented a paper prepared by F. E. Laramore on the Relative Merits of 200, 400, 600, and 1200 lb. Steam for Power and Process Steam. This paper was formally discussed by G. H. Spaulding of the Kimberly-Clark Corporation, Neenah, Wis., and was followed by considerable discussion by those present. Mr. Swengel indicated that the first step in the problem confronting any particular plant is to determine the amount of steam required for process and to determine whether or not this process steam can be reduced to a relatively few pressure categories. This will then provide the basis for a study of possible balance between power and process. It is evident that if all electric power requirements can be produced well within the range of the steam

(Continued on page 108)

TAPPI's Milwaukee Conference gathers for dinner at the Pfister Hotel

Congress Probes OPA On Paper Curb Tale

WASHINGTON, D. C.—Two OPA officials last week denied before a House Interstate Commerce Subcommittee that they had ever heard any one in the price-control agency suggest that the volume of advertising should be curtailed in connection with the newsprint shortage.

Representative Brown, Republican, of Ohio put the question to Frederick C. Holder of the Industrial Price Division, and Robert F. Nelson of the Paper Division as the subcommittee began hearings to determine how production of newsprint can be stimulated.

Mr. Brown said he had heard it had been suggested in OPA that "there is too much advertising and that it should be cut 25 per cent."

Both witnesses replied that they never made such a statement, nor had they heard any one else in the agency make it. Mr. Brown added that he hoped it was not true because, in his opinion, it would have been "an absolutely un-American statement."

Representative Wolverton, Republican, of New Jersey, followed up by asking if either official had ever heard it suggested in OPA that "20 per cent less newsprint from Canada would be satisfactory." Both replied they had never heard that suggested.

Although Mr. Holder testified that OPA has not yet decided on all of the nonagricultural products to be freed from price control by December 31, he said the outlook for decontrol of newsprint in the next three months is not promising.

Mr. Brown told both officials the new Price Control Act requires the removal of ceilings from newsprint by December 31, and advocated it as a means of enabling American publishers to buy paper which, he said, now goes to other countries because the world price "is from $6 to $13 a ton higher."

Mr. Brown, himself a publisher, told the witnesses that if newsprint is not decontrolled as to price and he is in the next Congress he will advocate further legislation on the subject.

Under questioning by committee members, Mr. Holder said OPA would make its decision after conferring with publishers and would give serious consideration to any recommendation of the House subcommittee.

Another highlight of the hearing came when Representative Wolverton held aloft part of a recent edition of the Philadelphia *Record,* which was printed on brown wrapping paper, and declared that when a metropolitan daily paper finds it necessary to "come out like this," there is a situation which demands immediate attention.

Chairman Boren brought out that brown wrapping paper costs $95 a ton as against $75 a ton for newsprint, and suggested that if he were a publisher he would rather be permitted to buy newsprint at $95 a ton than have to use wrapping paper at that figure.

Mr. Holder testified that until overall supply and demand come more nearly into balance, perhaps in the early part of 1947, "decontrol of the entire pulp and paper industry would in our judgment have extremely serious effects on the over-all economy."

As to the possibility of removing ceilings from newsprint only, Mr. Holder said "decontrol by segments of a fluid industry, such as the paper industry, might have dangerous and unstabilizing effects on the over-all economy of the United States through the medium of this primary raw material—pulpwood. Shifts in supplies of pulpwood might bring about sporadic shortages of various kinds of wood pulp which would in turn affect supplies of shipping containers, publishing-ing papers, sanitary papers and housing."

"It is our intention to maintain price levels which permit full production of needed paper and paper products until such time that supply and demand are more nearly in balance in order to maintain the greatest possible stability in the whole pulp, paper and paperboard industry," Mr. Holder added.

The OPA official said newsprint prices today are 47 per cent above those of 1941 and reflect recent increases of $6 per ton in December, 1945, and $7 per ton in August, 1946. These increases reflect the needs of domestic producers as well as the situation in world markets, the witness said.

Ferguson Leaves Eagle A To be Curtis Superintendent

HOLYOKE, Mass.—Howard Ferguson has been named superintendent of Curtis Paper Company in Newark, Delaware. He has resigned as superintendent of the Crocker Division of the American Writing Paper Corp. for the past eight years, and is leaving October 12 to join Curtis. Ferguson has been a papermaker with the Eagle A organization for 20 years. The Curtis mill makes high grade writing paper and greeting card stock.

Northern Mills Appoints Den Dooven Superintendent

GREEN BAY, Wis. — Edward Den Dooven, active in the paper industry for a number of years, has been named general superintendent of Northern Paper Mills, Inc., by A. B. Hansen, president and general manager. Mr. Den Dooven began his new duties October 1. He is former general superintendent of Hoberg Paper Mills here.

Jung Joins Dixie Sales

CHICAGO—Joseph J. Jung of 1951 North Howe Street, has been appointed sales representative in the Chicago territory of the Dixie Cup Company. Jung joined the Company in February.

Milprint Acquires Nicolet Control

DE PERE, Wis.—Sale of the Nicolet Paper Corporation mill at De Pere to Milprint, Inc., was announced Wednesday, October 2, by officers of both firms. M. T. Heller, Milprint president, said in Milwaukee that about $2,500,000 was involved in the transaction. Milprint has acquired all of the outstanding capital stock of the Nicolet concern and will operate the mill as a wholly-owned subsidiary. Several changes in officers and directors have been announced, but there will be no change in plant executives and personnel, it was announced.

Milprint, Inc., is a large converting corporation specializing in printing, lithographing and package converting, and has been called the largest buyer in the country of glassine. The De Pere mill has been engaged solely in the production of glassine since 1942.

It is expected that Milprint will enlarge production at the De Pere mill when more machinery can be added. At present, the mill produces 22 tons per day, and employs about 150 workers. An increase in personnel as high as a total of 250 is possible, it was stated.

M. T. Heller of Milwaukee, Wis., president of Milprint, Inc., will succeed C. B. Clark of Neenah, Wis., as president and as director of Nicolet, and William Heller will succeed H. B. Kuhns of Chicago and De Pere as vice-president and director. R. B. Ewens of Milwaukee will succeed Carlton R. Smith of Neenah as treasurer and director; Arthur Snapper of Milwaukee, succeeding Mowry Smith of Neenah as a director; and Edward J. Dempsey of Oshkosh, a director of Milprint, will remain secretary and director under the new setup.

The De Pere mill was built as a writing paper mill in 1891 by Shattuck and Babcock and was operated for about 20 years by the American Writing Paper Company. In 1927 it was sold to the Nicolet Paper Corporation.

Milprint, Inc., also has plants in Philadelphia, Los Angeles, San Francisco and Tucson, Ariz.

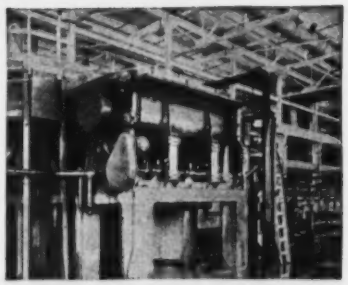
Consolidated Applies For Federal Dam License

WISCONSIN RAPIDS, Wis.—Consolidated Water Power and Paper Company has applied for a federal license for the DuBay hydroelectric project near Knowlton, Wis., the federal power commission announced October 2 in Washington. The announcement said that any project or request for a hearing should be submitted to the commission in Washington before October 3.

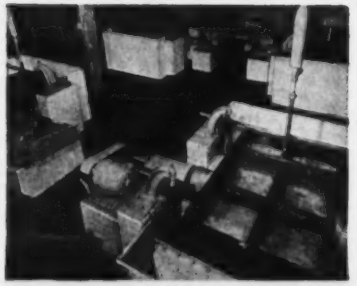
Consolidated officials said the application had been filed in compliance with the federal power act.

BIRD MACHINERY

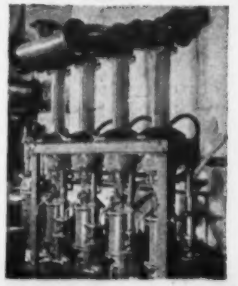
FOR BETTER PAPER AND MORE OF IT AT LOWER COST



BIRD SCREENS — the standard of the world for high speed continuous production of uniformly good paper.

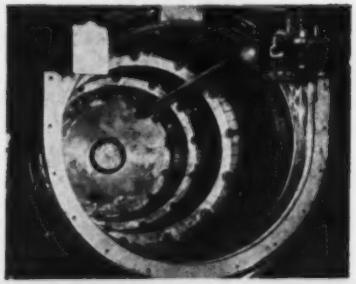


JONSSON SCREENS — for high capacity, high efficiency, low cost knotting and screening of pulps, brown stock, straw and fiberboard.

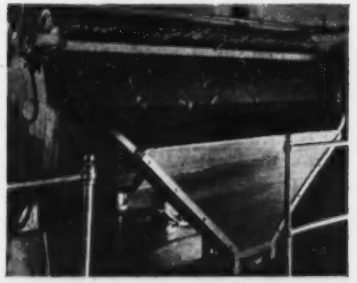


BIRD DIRTECS — for super effective, low cost removal of heavy, fine and light dirt by advanced application of the pressure drop principle.

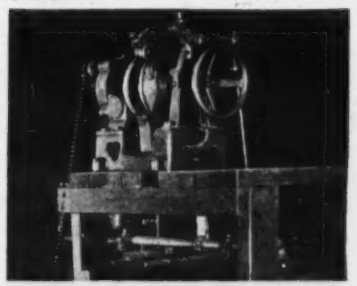
BIRD CENTRIFINERS — for triple centrifugal separation of hard-to-get dirt.



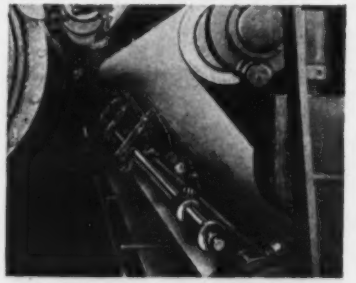
BIRD OSCILLATING SHOWER PIPES — for continuously efficient cleaning with minimum water.



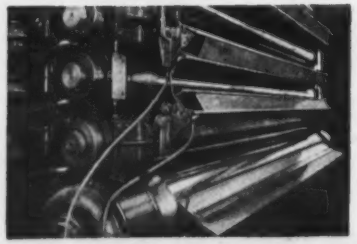
BIRD SAVE-ALLS — for recovery of stock from waste water at lowest net cost per pound.



BIRD CONSISTENCY REGULATORS — for dependable maintenance of stock consistency at not more than 0.1% heavier or lighter than desired; range from less than 1% to 12% consistency.



VICKERY FELT CONDITIONERS — for keeping press felt continuously clean and absorbent without shut-downs.



VICKERY DOCTORS for keeping all papermaking roll surfaces in shape to make better paper and more of it at lower cost.

Descriptive bulletins on each and every item — yours for the asking at

BIRD MACHINE COMPANY, South Walpole, Massachusetts

"A Rapid Reference For TAPPI Members"

Becker Sees Little Pulp From Sweden

MERRILL, Wis.—North America can expect little paper or pulp from Sweden in the immediate future, Folke Becker, president of the Rhinelander Paper Company, told eighty-six members of the Wisconsin-Upper Michigan Section of the Society of American Foresters at their annual meeting on September 27th and 28th at the Trees for Tomorrow Conservation Camp at Eagle River. Mr. Becker, who spent two months in Sweden and England this summer, spoke on Sweden's forestry program, particularly in relation to the paper and pulp industry. Operating on only 60 per cent of capacity the paper industry in that country is curtailed, he said, mainly because large numbers of woods workers, formerly employed solely in cutting pulpwood, have been shifted to cutting timber for fuel.

Wood is playing a dual role in Sweden. Not only as a raw material for the forest products industries but, because of the lack of coal, wood is used as fuel to keep the country's industry and transportation system operating. In this connection, Mr. Becker observed that it is remarkable how Sweden has converted to a wood economy without depleting its forests. He said they burned 5,650,000 cubic yards of wood per year during the war and are still burning large amounts.

Of particular interest to foresters were sidelights on Sweden's forestry program and the fact that production and consumption of timber practically balances at the present time. Mr. Becker referred to the fact that the most convincing observation gained by a trip through this country is that mismanaged or devastated forest without reproduction are seldom seen. He said that before World War II there were fourteen seed stations in operation and ninety-five nurseries from which 35,000,000 seedlings were delivered annually. Sweden has reforested 2,650,000 acres of non-producing forest land.

In summing up current trends in the pulp and paper making industry in Europe, he added that since Russia has taken over a great deal of the pulp producing capacity of Germany and Finland, the demand on Sweden's production by the rest of Europe has become just that much greater. Due to the OPA ceiling prices, Mr. Becker said, we cannot look for the same quantities as we imported from the Scandinavian countries prior to the war.

Henry Clepper, Washington, D. C., executive secretary of the Society of American Foresters, traced the development of forestry as a profession in the United States.

Much of the program arranged for the Society of American Foresters' meeting was devoted to field trips.

This meeting wound up the first year's activities at the Trees for Tomorrow Conservation Camp.

Folke Becker tells of prospects from Sweden

Maine Seaboard Dock Destroyed by Fire

BUCKSPORT, Me.—A spectacular fire, accompanied by violent gasoline tank explosions, has destroyed Time, Inc.'s Maine Seaboard Paper Division garage and dock which Division Manager George D. Bearce said represented $300,000 to $400,000 replacement value. Bangor and Bucksport firemen battled two hours to confine the roaring blaze to the dock, former Eastern Steamship Line pier, where the big newsprint company stored more than 50 trucks.

Bearce said only one truck was destroyed. Loss also included 100,000 feet of lumber and automotive equipment he said.

The towboat, Walter Ross, lying at the dock without sufficient steam up to move, was towed to safety by a power boat.

An undetermined quantity of gasoline exploded in several blasts that were audible and visible to observers a mile distant.

Cause of the fire was not immediately determined.

John P. Kennedy Retires From Eagle A Staff

HOLYOKE, Mass.—John P. Kennedy has resigned from the American Writing Paper Corporation.

A veteran of 29 years with Eagle A, Kennedy is recognized as one of the top flight papermakers in the country. For several years he was general superintendent of the Gill, Riverside, Nonotuck and Mt. Tom divisions. More recently he has been attached to the office of Peter Freidman as a commercial research expert and an analyst.

Kennedy did not reveal his future plans. He is winding up his career with the Eagle A the middle of October.

Fred Wohlers Joins Container Testing Lab.

NEW YORK—Fred Wohlers, formerly in charge of eastern package laboratories for the Hinde and Dausch Paper Company, has joined the staff of Container Testing Laboratories, Inc. Mr. Wohlers has been elected vice-president of the company, and will make his office at the New York laboratory.

An engineering graduate from Cooper Union, Mr. Wohlers has been active in the fiber box industries since 1925. He has been employed as a development consultant for both the old Paperboard Industries Association and for the National Container Association. In March 1931, he established the Laboratoire Generale pour Embellages in Paris, and was in charge of this operation until the beginning of 1934. Since then he has been active in various research and development activities for the Hinde and Dausch Paper Company.

Independent Union Wins Kimberly Election

KIMBERLY-CLARK, Wis. — The Kimberly-Clark Workers Union last Friday, October 5, won a more than two-to-one victory over the United Mine Workers, District 50, in a bargaining election conducted by the Wisconsin Labor Relations Board. The independent union received 769 votes to 327 for the Mine Workers. Eleven voters opposed both unions. Out of a possible 1,225 votes, 1,107 were cast.

The Power House and Boiler Room at the mill voted separately. Nineteen votes were cast against separate bargaining and 17 favored it. The count on which union was favored was as follows: United Mine Workers, 11; International Operating Engineers, 16, and the independent union, 12.

THE JACKSON LABORATORY . . . where Du Pont Dyestuff Research is carried on. Full attention is again concentrated on peacetime studies.

Bring your coloring problems to Du Pont. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.

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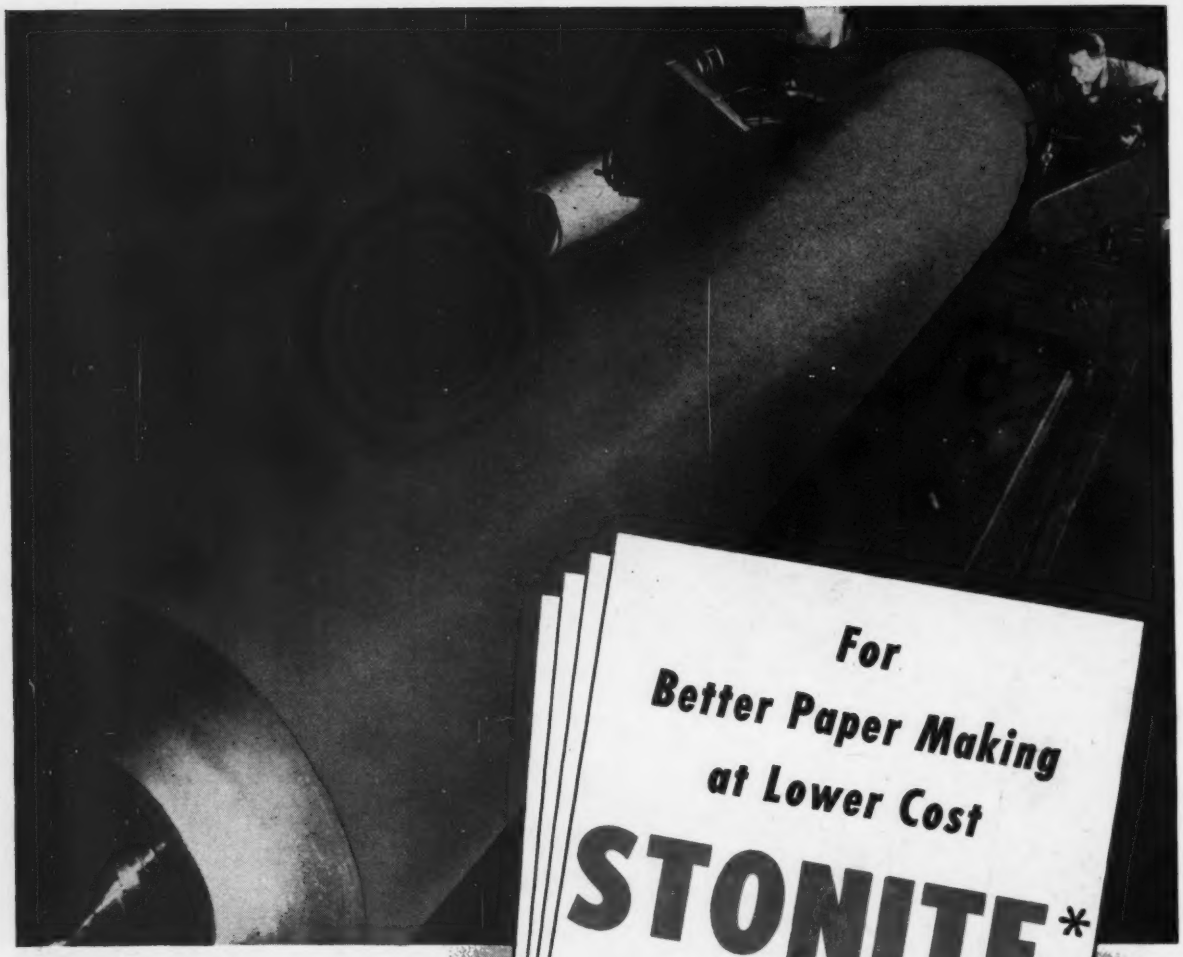

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STONITE* ROLLS ASSURE...

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- ★ NO CRUSHING
- ★ FEWER BREAKS
- ★ IMPROVED FINISH
- ★ UNIFORM THICKNESS
- ★ LESS PICKUP AND STICKING
- ★ LOWER PRODUCTION COSTS

For *better finished* papers Stonite* Rolls are first choice in mills from coast to coast and in 33 foreign countries. Their hard, granite-like surface of fine-grained texture has low adhesive qualities and a high affinity for water. This means quick release and fewer breaks — smooth performance on practically all grades of paper from tissue to board.

Reduced weight prevents crushing of sheets and increases the life of felts — thus lowering production costs.

Stonite* Rolls are as easy to renew as a rubber roll, and as Stonite* is applied to a metal body, any roll of sufficient body weight can be converted into a Stonite* Roll simply by recovering it.

*Ebonite and Granulated Stone Composite U. S. Patent 1,787,890 Re. 18,111.

STOWE-WOODWARD
INCORPORATED
Craftsmen in Rubber
NEWTON UPPER FALLS 64, MASSACHUSETTS

New York Office, Woolworth Bldg., New York 7
Stowe-Woodward Rolls are made on the West Coast by Huntington Rubber Mills, Inc., Seattle 4, Washington.

ESCO Blow Pipe and Blow Pit Bottoms

prescription for cleaner pulp . . .

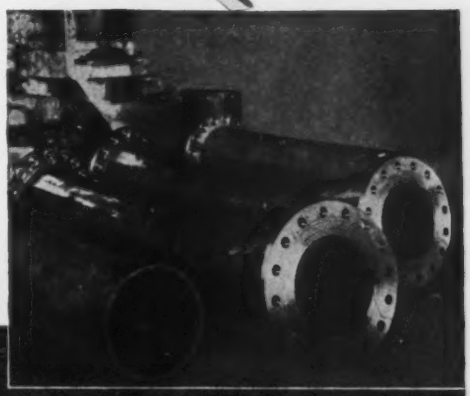
In order to produce cleaner pulp, reduce costly shut-downs, and increase production, more and more pulp mill operators are changing over their old fashioned Blow Pipe and Blow Pit Bottoms to modern and clean Stainless Steel equipment.

ESCO Stainless Steel Blow Pipe is designed to resist the severe stresses set up in the blowing operation and to meet the approval of State industrial and insurance inspectors. It is carefully machined, hydrostatically tested, and rigidly inspected.

Stainless Steel Blow Pit Bottoms furnished by *ESCO* are carefully laid out for economical shearing of the plate and ease of installations. They are accurately perforated to insure the most efficient drainage.

The *ESCO* engineering and metallurgical staffs are ready to assist your engineers in the selection of the proper type of Stainless Steel to use and, if necessary, to redesign your Blow Pipe and Blow Pit Bottoms for the most economical and trouble-free replacement. We invite your inquiries.

Your nearest *ESCO* representative will be glad to provide full information about any pulp mill problem involving the use of Stainless Steel. Bulletins No. 155 "*ESCO* Circulating Systems," and No. 157 "*ESCO* Stainless Steel Products" will be mailed on request.



One of many stainless steel blow pit bottoms and wash piping in large Western pulp mill

ELECTRIC STEEL FOUNDRY STAINLESS STEEL FOR ULTIMATE ECONOMY

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filled a thousand tank cars
CENTRAL
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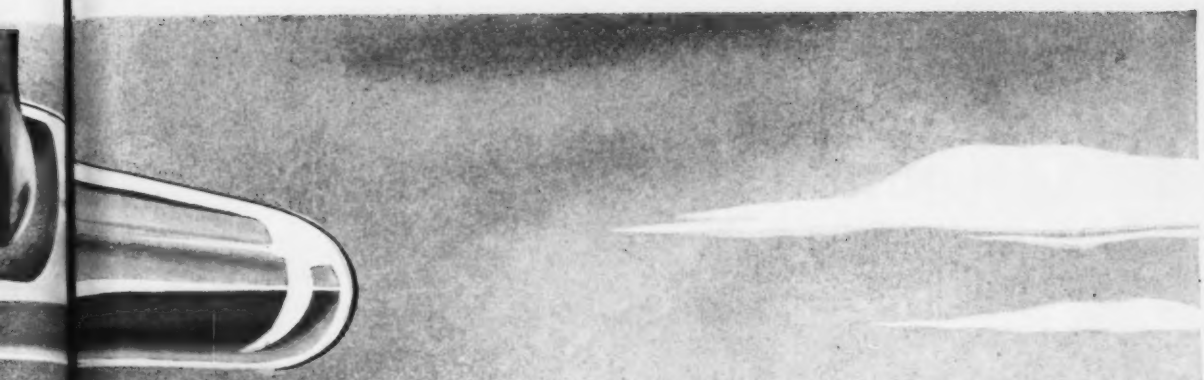
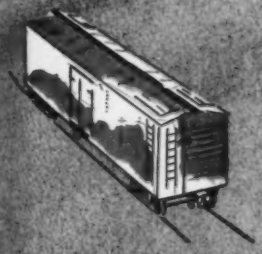


Sired by research, conceived in a laboratory, born in a test tube . . . and shipped by the carload.

That's a thumbnail biography of many Flintkote Industrial Products widely used in maintenance, in new construction, and in processing.



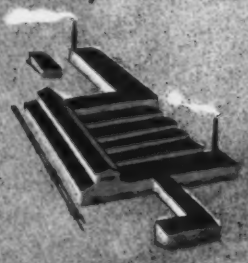
Flintkote Hydralt* Protective Coatings are asphalt in its most modern form . . . stable, durable, mineral-colloid emulsions used on steel freight cars and ships . . . to prevent damage from weather and corrosion.

To meet standard and special requirements of saturation, bonding, coating, etc., the broad line of FlintkoteSyntex* Products includes aqueous dispersions of rubbers and resins. For example: Tire Cord Solution for rayon and

cotton tire cord . . . Rug and Carpet Backings . . . Textile Laminants and Coatings.

Flintkote Sound Damping Materials are but one of many types of Flintkote-developed materials . . . all helping manufacturers make better products.

For buildings, inside and out, Flintkote Hydralt Protective Coatings shield metal and concrete surfaces against rust and weather. Mastic Floors made with Flintkote Flooring Emulsions are cold-laid, easy to apply, economical to maintain.



What do you make . . . boxes or busses? Carpets or coatings? Whatever it is, no doubt a Flintkote Product can help you.

Write us. Our entire research, development and manufacturing facilities are at your disposal.

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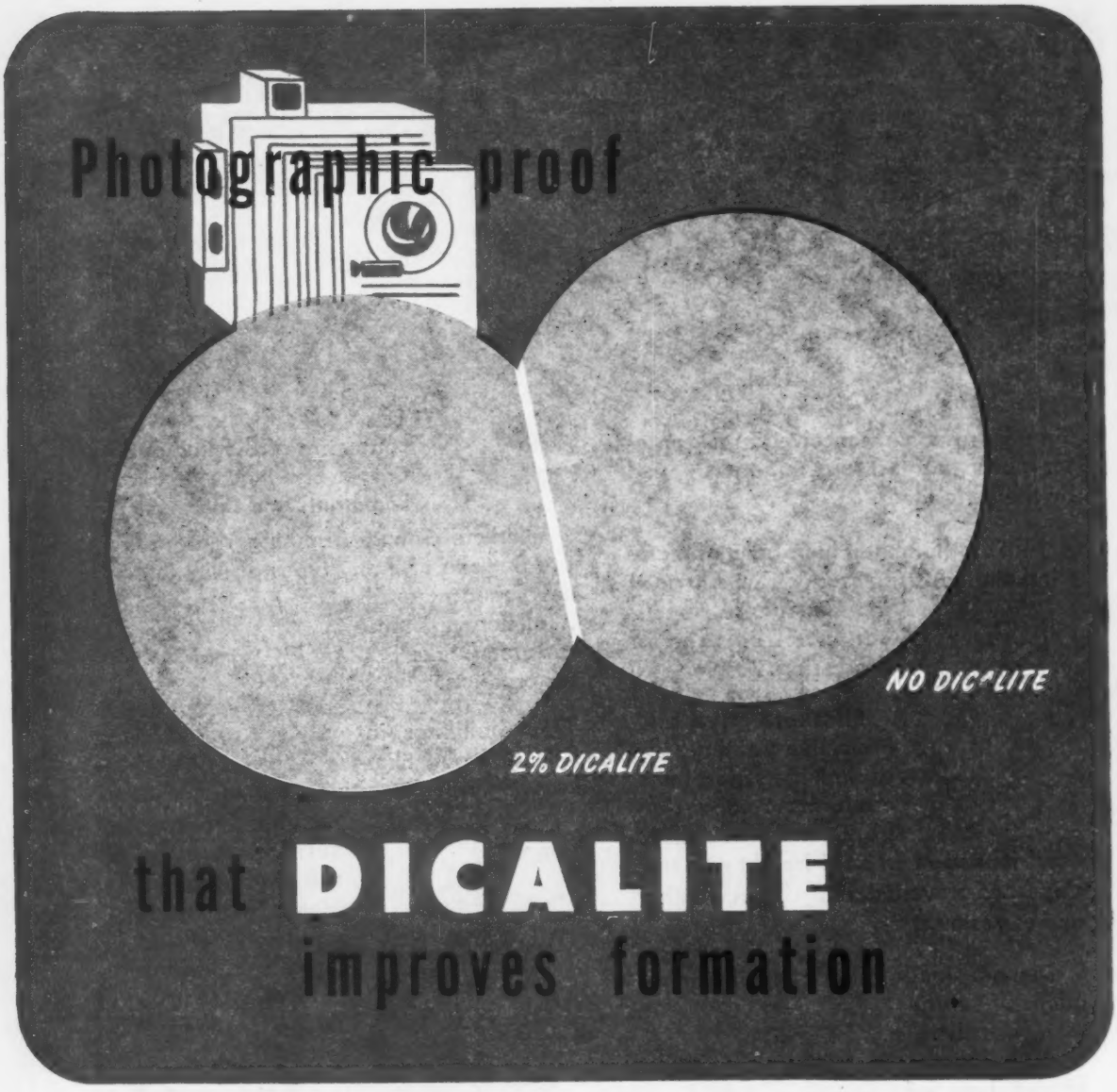

...it's a true "Paper-Aid"

Looking at the above illustration gives the same effect as if you were looking through the sheet in front of a strong light. It is a photo of a 50-lb. offset sheet made by a well known mill, taken by placing the sheet over glass behind which was a strong light.

The improvement in formation is very obvious in the sheet containing 2% of Dicalite, which is the only difference in the two specimens. Dicalite (being more finely divided than the paper fibers) makes the voids smaller and more uniform. Further, it causes the fibers themselves to disperse more evenly, giving more uniform formation and eliminating "thick" and "thin" spots.

THE DICALITE COMPANY
CHICAGO 11 • NEW YORK 5 • LOS ANGELES 14

DICALITE
PAPER-AIDS FOR BETTER PAPER PRODUCTS

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"IN THE CHIPS"
for Higher Output and Profit
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T-18
Chipper Knives

Special T-18 Steel, from Simonds own steel mills, is hardened at heats higher than any encountered in chipper operation. So uniform temper is held throughout the life of the knife. And the keen edge is held, too, under heaviest cutting conditions. In fact, you get many extra hours output of even-sized chips, a longer operating time between sharpenings than with other knives. Plus far higher resistance to cracking, chipping and corrosion. Order Simonds T-18 Chipper Knives from your dealer or from the nearest Simonds office.

BRANCH OFFICES: 1250 Columbia Rd., Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash.; CANADIAN FACTORY: 595 St. Remi St., Montreal 30, Que.

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READING HOISTS

Stationers Expect 60 Per Cent Supply

CHICAGO—Some ray of hope came to certain paper jobber quarters this week when Lester S. Crowl, president of the Blande Printing and Paper Company of Toledo, Ohio, reported that supplies of gift wrapping, seals and stationery items appropriate to the holiday season will be available in larger quantities this year. Mr. Crowl spoke before the fortieth annual convention of the National Stationers Association held at the Palmer House. The speaker, who is also vice-president of the distributors division of the Association, further stated that in his estimate, stationers stocks of the holiday items will be 50 to 60 per cent of the demand as compared to last year when supplies were reported as about 25 per cent of the demand.

Industry-wide production of basic lines of stationery and supplies is about a year behind demand, the speaker estimated. Products for industrial use and special fields call for a wide variety of raw materials, according to Mr. Crowl, and for that reason output has been badly hit by current shortages. Itemized in his remarks was also the statement that many of the items used in business will continue in short supply because of metal and fabric shortages and inadequate supplies of paper of all types. Even some types of glue have been added to the list of shortages as a result of a curtailed livestock situation. New business requirements, making necessary the purchase of complete stocks of forms, equipment and supplies, have also heavily taxed the stationery and paper trade and school supplies, for a record number of students have added to the burden far in excess of what the average citizen believes. Even the change in air mail rates is expected to boost demand for special stationery and adds to the general terrific impact of over-all demand.

NPTA Convention Plans Record Program

CHICAGO—From Chicago trade leaders comes word that the annual convention of the National Paper Trade Association at the Edgewater Beach Hotel is likely to set some records for attendance and importance of program to be discussed. All affiliate organizations are reported planning meetings of special interest certain to attract the trade from all parts of the country and the Paper and Twine Association, in particular, is said to be building its program around the work of the Institute of Paper Chemistry which is considered most invaluable to the trade. Dr. Westbrooke Steele, director and Dr. H. F. Lewis, dean of the Institute are expected to be on hand as is Ernst Mahler, President of the Institute and vice-president of Kimberly-Clark Corporation.

Tissue Industry To Meet at Shawnee

NEW YORK—Ross A. Fife, Executive Secretary of the Tissue Association, Inc., reports that the annual fall meetings of the tissue industry will this year be held at the Shawnee Country Club, Shawnee on the Delaware, Stroudsburg, Pa., from October 13 to 16. The first Committee Meeting will be held on October 13th. Then on the afternoon of the 14th there will be a meeting of the Board of Governors of the tissue Association, Inc.

The General Industry Meeting will be held Tuesday morning, October 15, and is open to all manufacturers of tissue paper and tissue paper products. The program will cover fully important current problems of the industry. One of the speakers, whose talk is looked forward to with especial interest, is an expert on the world supply of wood pulp, just returned from an extended stay in Scandinavia.

Tuesday afternoon has been set aside for the industry's golf tournament. This is being handled by a golf committee made up of: Sam Lopin, Chairman, John Maloney, and John McKirdy, Jr. Numerous prizes will be awarded and a large number is expected to play.

At the Industry Banquet on Tuesday evening the speaker will be E. W. (Ted) Tinker, Executive Secretary of the American Paper and Pulp Association.

On Wednesday morning, October 16, there will be a meeting of the Tissue Industry Advisory Committee for the Office of Price Administration.

The advance registration indicates that this will be one of the best attended meetings in the history of the Tissue Industry.

Paper Firms Respond To Community Appeal

HOLYOKE, Mass.—Edward P. White of the White & Wyckoff Manufacturing Company spoke on "Why Corporations Give to Local Health and Welfare Causes" when more than 100 representatives of local industrial firms, banks and mercantile establishments attended the kick-off dinner of the initial gifts division of the annual Community Chest Drive. American Writing Paper Company, Marvellum, National Blank Book Company, White & Wyckoff, Parsons Paper and Hazen Paper, were among the first fourteen firms to pledge contributions to the local 1946 Community Chest Campaign.

American Manufacturing Moves Chicago Office

CHICAGO—The local office of American Manufacturing Company, Brooklyn, N. Y., cordage mill, has been moved to 800 North Clark Street. The office had been temporarily located at 620 West Fulton Street.

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CHROMOTEX
it's that kind
of a name
It's one thing to make a name. What counts more is living up to that name over and over again — year after year — so that eventually people say "That's a name you can count on."
Mathieson is that kind of a name. For over 50 years, in peace and war, in good times and bad, Mathieson has been well known for producing and delivering the highest quality chemicals according to the best traditions of American business.
Each Mathieson chemical is outstanding in its own field. Each carries an important guarantee on its label — the guarantee inherent in the name of its maker. We repeat, Mathieson is that kind of a name.
THE MATHIESON ALKALI WORKS (INC.)
60 East 42nd Street, New York 17, N. Y.
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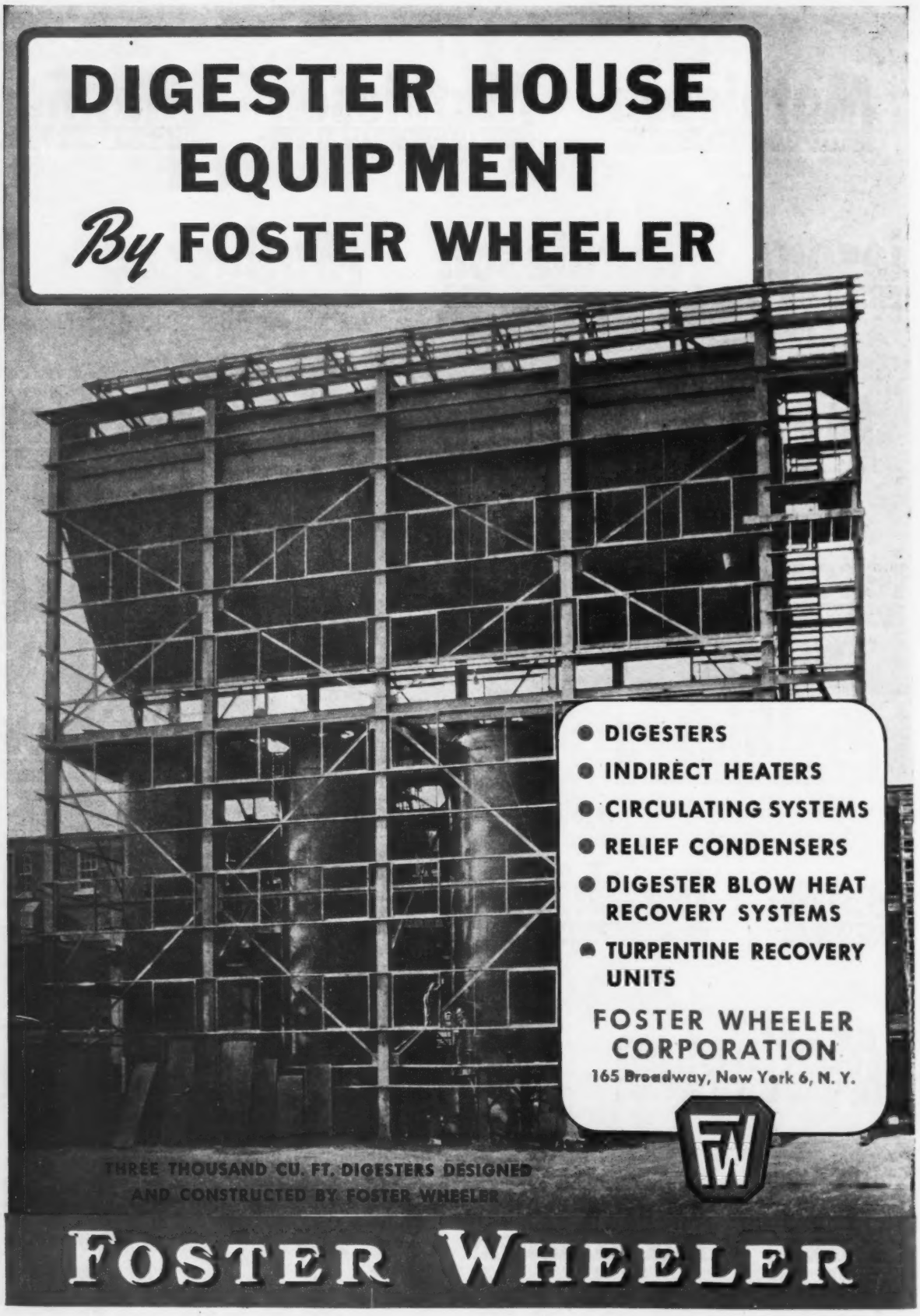
DIGESTER HOUSE EQUIPMENT *By* FOSTER WHEELER



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- TURPENTINE RECOVERY UNITS

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165 Broadway, New York 6, N. Y.

THREE THOUSAND CU. FT. DIGESTERS DESIGNED AND CONSTRUCTED BY FOSTER WHEELER

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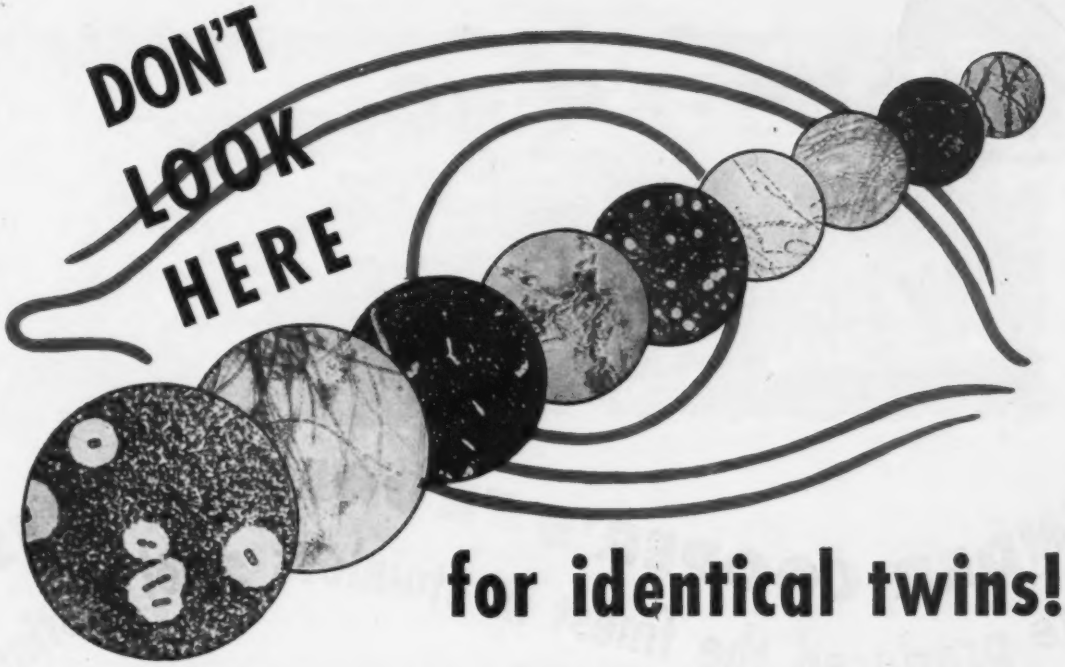

for identical twins!

The slime problem at one paper mill is never identical with that encountered at another. There is always a significant difference somewhere — in the microorganisms, in the source of contamination, in white water handling, or in process flow.

This means that slime control — to be thoroughly effective — must be individually matched to mill conditions. Slime can never be efficiently eliminated by any "cure-all" approach. That is the reason W&T ENGINEERED SLIME ELIMINATION is utilized by so many mills.

Following a mill survey, Wallace & Tiernan Engineers recommend the particular method most effective in destroying slime, saving chemicals and improving product quality under the specific conditions encountered.

In many cases Break-Point Chlorination may be applied to the fresh water supply, while chloramine treatment and other chemicals are used to control microorganisms introduced through the stock, and also to prevent recontamination from air-borne organisms.

The benefits of an experience based on making over 25,000 water supply chlorinator installations and in treating slime in over 300 paper mills, are yours for the asking. Wallace & Tiernan Company, Inc., Newark 1, New Jersey. Represented in Principal Cities.

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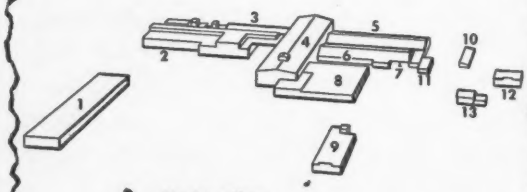
Engineered
SLIME
ELIMINATION

UNDER COOPER'S "ROOFED ACRES" are produced the finest in stainless steel castings



1 Machine Shop
2 Chemical & Metallurgical Laboratories (X-Ray and Zyglo Depts.) Engineering Department
3 Core Shop
4 Foundry
5 Finishing Department
6 Maintenance Department
7 Fitting and Valve Warehouse
8 Pattern Storage
9 Pattern Shop
10 Heat Treating Department
11 Pickling & Lustracast Department
12 Office
13 Restaurant

Space — ample, usable space — is necessary to the proper operation of any foundry, but only Cooper has *three acres* of roofed plant facilities devoted exclusively to the production of stainless steel castings.

Vast as this area is, every square foot has a functional duty in the Cooper operation — and there are seven additional acres, as yet unimproved, available for further expansion.

To you, as a user of stainless steel castings, Cooper's unparalleled facilities mean a sounder product and more reliable delivery — and you benefit by all the latest developments in foundry equipment and procedure. You will benefit, too, because the entire Cooper organization — from laboratory to foundry — is large enough to provide *all* the specialized knowledge required to give you superior castings — as well as the best advice as to their application.

Whenever you need stainless steel castings — get in touch with Cooper.

THE COOPER ALLOY FOUNDRY CO.
145 Bloy Street, Hillside, N. J.

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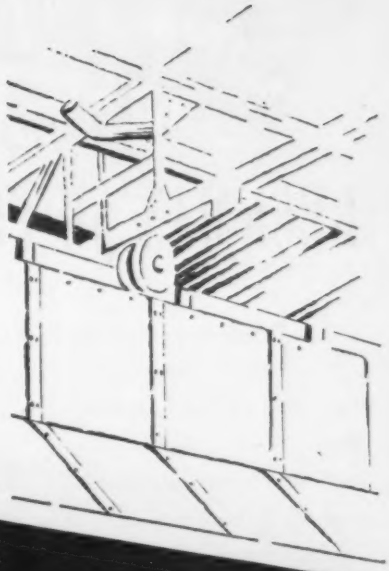
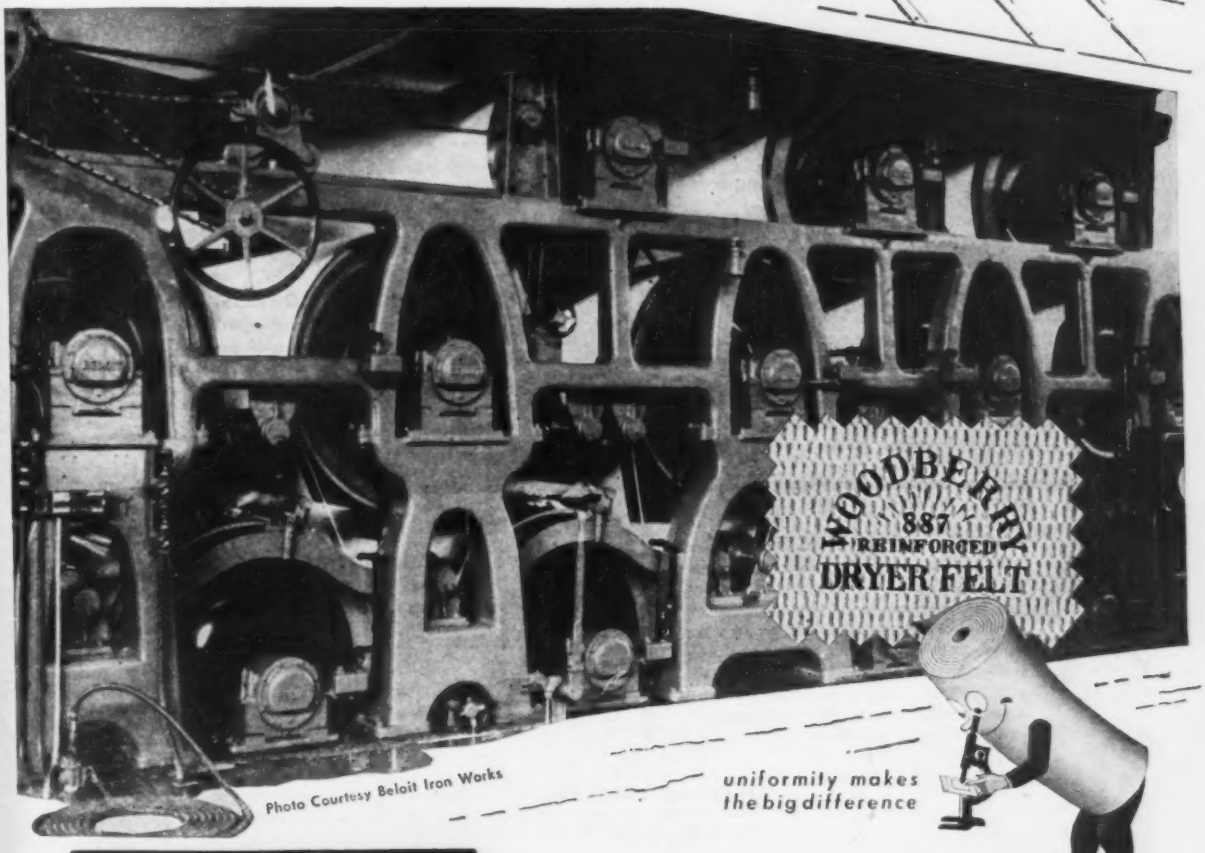
Maximum Wear at Minimum Cost

Longer wearing contact surfaces, minimum amounts of shrinkage and stretch, and a higher degree of porosity, which results in lower steam consumption, are features that have made WOODBERRY 887 all-cotton dryer felts the prime choice of the paper industry.



For felts that will give maximum wear with minimum costs, specify WOODBERRY 887 all-cotton, heavy duty dryer felts.



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uniformity makes the big difference

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How much is waste costing in YOUR plant?

Here's how you can reduce it with BECKMAN pH CONTROL

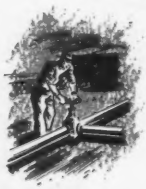
IN industry after industry Beckman pH Control is reducing costs, minimizing waste, saving time and greatly increasing production efficiencies. Have *you* investigated what this amazing new profit tool can do in your plant? *Wherever there's water, there's pH.* So if you use water or water solutions of *any* kind . . . whether in pulps, liquids, or semi-solids—in process solutions, waste disposal or any other way . . . chances are that Beckman pH Control can help you do the job better—*for less.* Here, for example, is how others are slicing costs with Beckman equipment . . .

BECKMAN IS THE ONLY HIGH TEMPERATURE—HIGH pH EQUIPMENT

★ An important point to remember when installing pH control in your plant is that there is only ONE make of modern glass electrode pH equipment which can be used *continuously* in high temperature solutions. Even in boiling hot solutions, Beckman *High Temperature Glass Electrodes* give uniform accuracy and long life. This advancement is particularly useful in many food processes . . . in boiler feedwater conditioning . . . and in a wide range of chemical processing operations.

★ Beckman is also the only modern glass electrode equipment with which you can make high pH measurements *even in the presence of sodium ions* . . . a development that has extended the usefulness and accuracy of the glass electrode to many new industries where alkaline solutions, in combination with sodium ions, heretofore presented difficulties. A few of the many fields in which this Beckman development has proved indispensable include soap making, the manufacture of bleaches, detergents, etc.

SAVING CHEMICALS: By Beckman-controlling processes where chemicals are used, operations can be controlled so closely that overdosage and excess use of chemicals can be practically eliminated. Not only does this cut chemical costs, but it also assures more uniform processing, more accurate production control and greater plant efficiency.



REDUCING CORROSION: More and more plants are discovering the many advantages of reducing corrosion with Beckman pH Control. By Beckman controlling-process operations, these operators are able to regulate acidity and alkalinity — and thus neutralize excessively corrosive solutions before they damage costly plant equipment.

MINIMIZING REJECTS: Beckman pH Control is also making important savings by assuring more uniform quality of production. In many operations only a small change in pH makes a great difference in operation of the processing solutions. By Beckman-controlling the solutions, run after run is processed with identical quality, thus reducing rejects, cutting production costs and making greater savings in over-all efficiency.

SAVING TIME: Just as heat can frequently speed up chemical processes, so proper pH control can often save on processing time. Here again, even a relatively small saving on each production run quickly builds up to tremendous over-all savings in labor and plant overhead.

Let our engineering staff study *your* particular pH problem and make recommendations on the type of equipment best suited to your requirements. No obligation, of course.

For helpful information on pH control, send for this free booklet "What Every Executive Should Know About pH!"

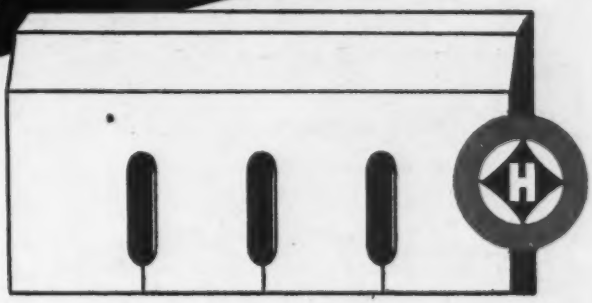
BECKMAN

BECKMAN INSTRUMENTS • NATIONAL TECHNICAL LABORATORIES
SOUTH PASADENA 16, CALIFORNIA

INSTRUMENTS CONTROL MODERN INDUSTRIES

Heppenstall has doubled their capacity

on E.I.S. Chipper Knives

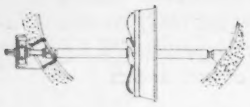


assuring faster deliveries—
eliminating overdue orders

Our sincere thanks to you who have been tolerant during a difficult period. Now, we are ready to meet the greatly increased demand for Heppenstall E.I.S. Chipper Knives. The installation of new and modern equipment has made it possible for us to produce knives, faster and in much larger quantities than ever before.

Heppenstall Chipper Knives are always the most economical and profitable to use. We back that statement with a long-established guarantee—more production and less waste per grind, longer periods between grinds, and more grinds per knife. They'll show a lower unit cost than any chipper knife on the market! Isn't that all you ask? All we ask is that you try them! The Heppenstall Company, Pittsburgh 1, Pennsylvania.

Can your Agitation be Improved?



Shrouded type propellers are used where a directed flow is required. They are especially suitable for chests which cannot be partitioned and for stocks of pumpable consistencies.

CHANCES are that substantial benefits in both performance and costs can be realized by modernizing your methods of agitation.

Proper agitation is under constant specialized study at Impco. This study has produced many varieties of agitator elements—single and multiple assemblies, vertical and horizontal assemblies of propellers, screws and sweeps for effective agitation of conventional and unusual stock chests.

Send a short outline of your problem. We will gladly develop preliminary layouts for discussion or submit a proposal.

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QUALITY
GDC
SERVICE
DEPENDABILITY
GENERAL DYESTUFF CORPORATION

Consolidated Builds Twenty New Houses

WISCONSIN RAPIDS, Wis. — Twenty new homes will be built by Consolidated Water Power Company, its new housing department announced last week. The company recently applied to the city for sewer and water connections by October.

The new homes will be along prefabricated lines. The company's plastic material, Consoweld, is being utilized extensively throughout the residential structures. The first of these residences is already underway, with the approval of the Federal Housing Administration in respect to methods of fabrication and financing, as the company is anxious to help relieve the housing shortage in some small measure.

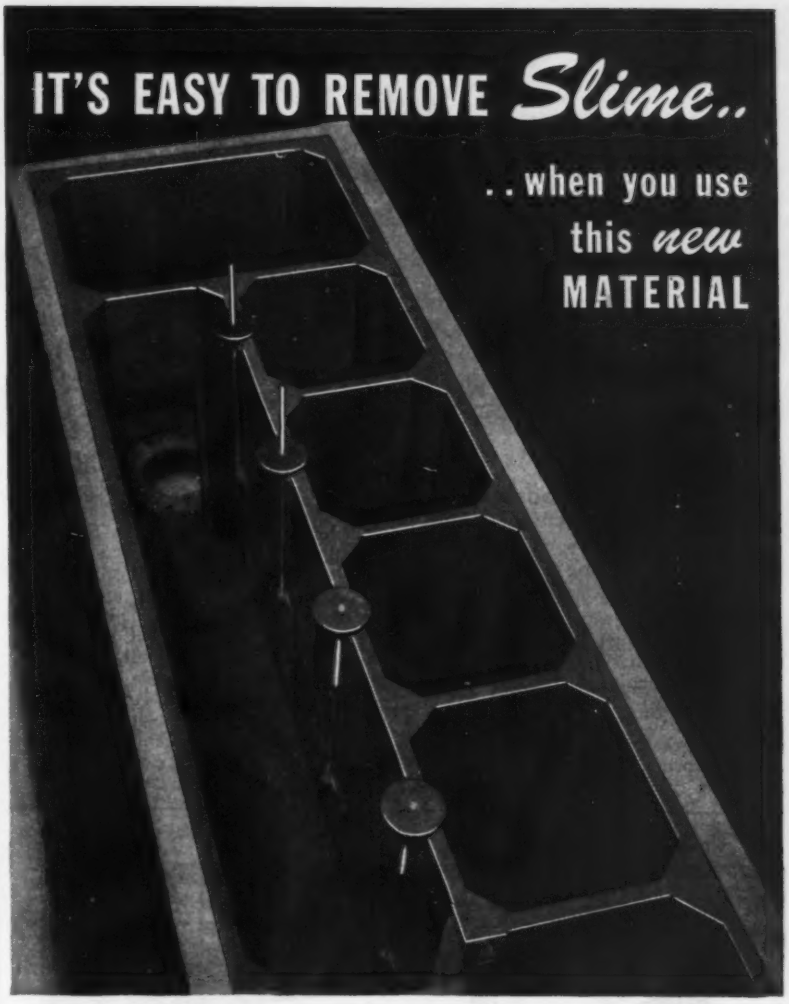
Excavation has been completed and foundations are being made ready for the homes which are to be built and transported sectionally to the building sites for placement.

Varying somewhat in design, all will be much like the basic experimental home erected last winter. In accordance with governmental regulations, the houses are to be offered for sale first to ex-servicemen. If they are not disposed of after a 30-day period, they will then be available to other buyers. Full notice will be given when the homes are ready for sale. Purchase prices have not been established.

The exterior work on the dwellings will be of wood, all thoroughly kiln-dried. Inside walls and ceilings will be of Consoweld. The first to be built will be 24 by 53 feet, and each will have a one-car garage. The living room is to be 12 by 17, the kitchen and dinette 9 by 15 feet, and two bedrooms 11 by 12 and 10 by 12. An oil heater for hot water is furnished along with an oil-burning furnace. The bathroom with tub and shower will contain floor and walls of solid Consoweld, considered superior to tile construction, and the kitchen will be provided with heavy Consoweld furnishings similar to the bathroom. All outside walls and ceilings will be insulated for maximum warmth.

Mid-States Names Two Specialists to Staff

CHICAGO — To handle its rapidly growing Chicago clientele more adequately, the Mid-States Gummed Paper Company has recently appointed two new sales representatives in the persons of Walter Howard and Howard Phillips. Mr. Howard was formerly products manager of Green Core Box Tapes and Gummed Hollands and has had a wide experience in handling the Mid-States gummed paper line. Mr. Phillips was products manager of Green Core Sealing Tapes, and tape specialties and has a wide acquaintanceship through this territory as well as a most intimate working knowledge of Mid-States products.



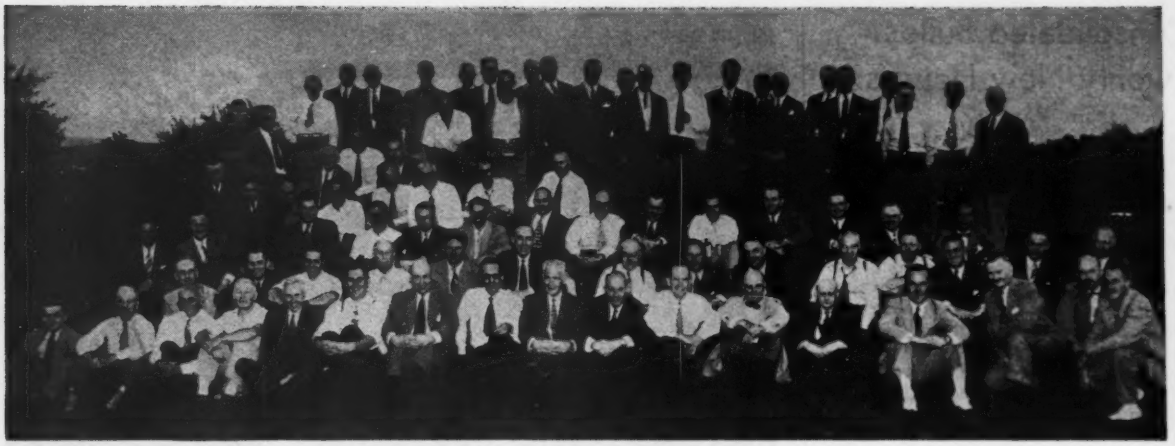
Slime can be removed easily and quickly from any stock flow box or trough by using a recently developed material. Shown here is a cylinder head box built by Cheney Bigelow in which this new material has been incorporated.

Let one of our representatives give you further information about this remarkable slime-repellant material. Write today.

CHENEY BIGELOW

Fourdrinier Wires • • Dandys • • Cylinders • • Wire Cloth
Pulp and Paper Mill Equipment

CHENEY BIGELOW WIRE WORKS • 417 LIBERTY STREET • SPRINGFIELD, MASS.



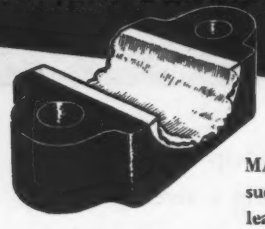
When the New England Paper Trade Association turned to golf for a day

American Paper Goods Plans Doubled Production Volume

CHICAGO — An eventual doubling of the present record-breaking production of Puritan Cups and Containers was predicted by Edward S. Lancaster, president of American Paper Goods Company, as the company announced the formal opening October 17 of its new $1,500,000 Chicago factory. This will be possible, it was revealed, because the greatly increased efficiency of the new production facilities has enabled the company to add paper cups and containers to the envelope and bag lines which formerly had been produced in Chicago. Hitherto, the Puritan production had been confined to the home plant at Kensington, Conn.

The announcement was made at an open house held at the new plant by American Paper Goods Company on the opening day of the fall meeting of the National Paper Trade Association at the Edgewater Beach Hotel. A cocktail party in the afternoon gave guests the opportunity of seeing what was described as the latest and most modern plant in the paper converting field.

WHEN BEARINGS SQUEEZE OUT



Two metals by MAGNOLIA for high bearing pressures.

POWER for extreme conditions and where the application justifies the use of still-scarce tin.

PYRAMID for less extreme pressures and temperatures.

MAGNOLIA offers two bearing metals for just such conditions . . . the tin-base POWER and the lead-base PYRAMID. Both are designed to withstand extremely heavy sustained loads and high local temperatures such as are normally encountered in heavy duty machinery of all kinds. Both metals are alloyed to provide the desired hardness, strength and high softening point. They do not flow under sustained heavy loads and/or high temperatures.

But before or when you order your supply of POWER or PYRAMID for your mill supply dealer, send for your copy of the MAGNOLIA Bearing Metal Bulletin. It is full of valuable refresher information on how to pour bearings as well as scores of application suggestions.

Look for the Flower Brand

MAGNOLIA METAL COMPANY
18 WEST JERSEY STREET, ELIZABETH 4, N. J.

MAGNOLIA BEARING METALS

Salesmen Ring Down Outdoor Season Curtain

CHICAGO—The Western division of the Salesmens Association of the Paper Industry rang down the curtain on the summer outing season on Friday, September 27, when a fair and certainly enthusiastic crowd of SAPEYES and guests journeyed to the Park Ridge Country Club for golf, prizes, food and festivities. It was a "perfect" day. The weather was mid-summer in character and J. C. Keeney, golf chairman, achieved the heights of success when he arranged it so that everyone present won a prize! This fact alone caused those present to consider the possibility of smashing precedent and of electing Jim Keeney as perennial golf party arranger despite his duties as a sales executive for the Kimberly-Clark Company. Following the golf, the SAPEYES had one of their most enjoyable dinners with good food and a song fest that was reported to have surpassed all others in solo performances. Tom Gorman, Union Bag Company, established himself as the most capable successor to John McCormack as another "Irish thrush," and gave his appreciative audience some real vocal treats. Another surprise entry was Arthur Brown of Nekoosa-Edwards Company, who had the words to several excellent songs but was reported to have failed to come up with the music! From all reports, it was a gala event and one that augurs well for the 1947 season.

Kimberly-Clark Shifts Hours

NEENAH, Wis. — Kimberly-Clark Corporation's office workers have started a new schedule of hours. They are starting at 8 o'clock in the morning and will quit at 5 o'clock in the afternoon, one-half hour later in both instances than previously. The corporation held its first general meeting of salesmen since 1944. It started Monday, September 30, at the North Shore Golf Club, and ended at the close of Wednesday's session, October 2.

—count on UFORMITES 467 and 470!

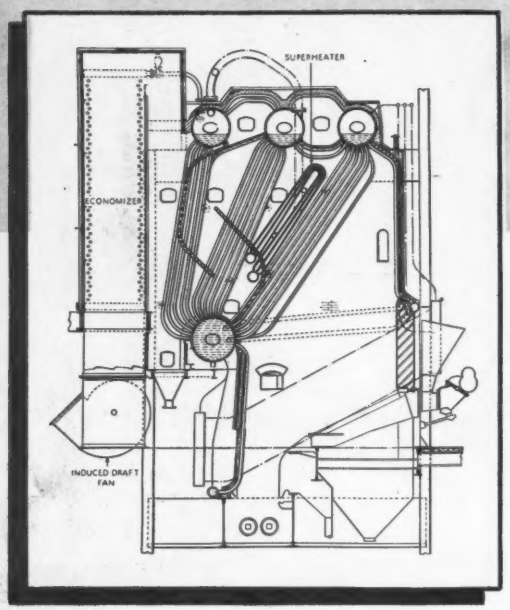
When you are looking for a low cost, simple way of increasing the wet strength of your paper, whether it is bag stock, toweling, glassine, wrapping, chart, blueprint or ledger papers, you'll find the UFORMITES a logical choice. These urea formaldehyde resins require no pretreatment, no aging, no special equipment, no change in your regular production technique, impart no color, odor or taste.

UFORMITE 467 is designed for use with Kraft by beater addition . . . UFORMITE 470 is recommended especially for sulfite, rag and groundwood, and for all stocks where high efficiency is desired in papers with low acidity. As little as 1 percent resin solids on dry fibre weight will increase wet strength as much as 30 percent! In addition to high wet strength, UFORMITE 467 and 470 improve dry tensile and Mullen, fold, uniformity of sizing and coating surface characteristics. Prove to yourself the low cost and efficiency of the UFORMITES . . . investigate them today.

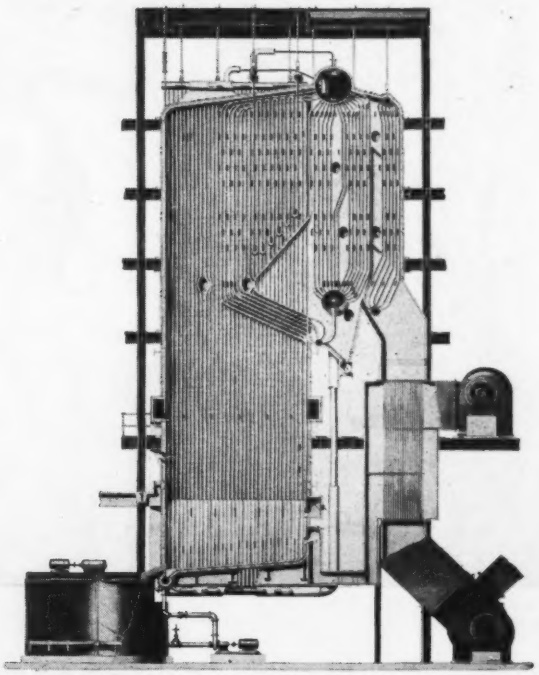
UFORMITE *is a trade-mark, Reg. U.S. Pat. Off.*

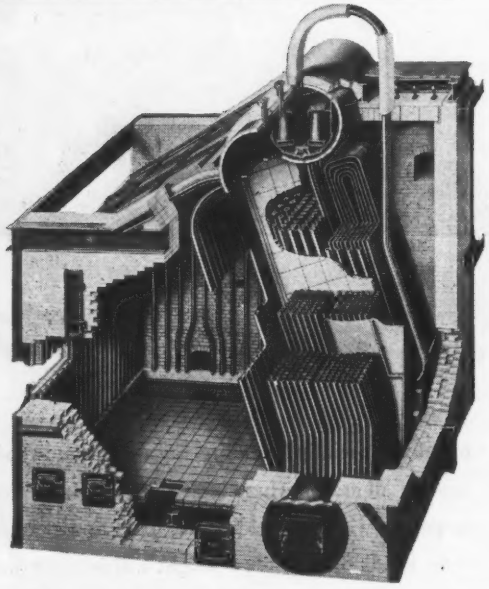
THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.



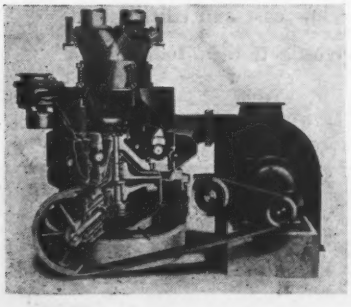
RECOVERY UNITS. High chemical recovery and reduction, dependable steam generation and ability to handle wide variations in black liquor concentrations are obtained at low operating cost in sulphate paper mills with B & W-Tomlinson Recovery Units.



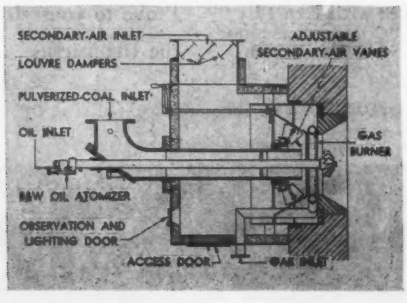


BOILERS. The complete line of B&W boilers and related equipment meets all paper mill requirements for dependable, low-cost steam generation in any combination of capacity, pressure, temperature, fuel, and space conditions. Particularly popular B&W boilers for power and process steam in Paper Mills are the Integral-Furnace Boiler (left) and Stirling Boiler (upper left).

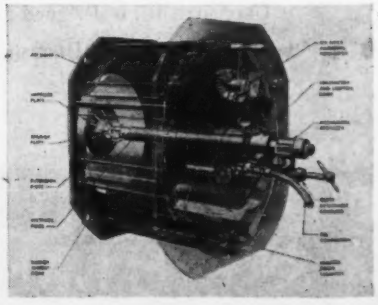
PULVERIZERS. For pulverized-coal firing of power boilers B&W Pulverizers offer many installation, operating, and maintenance advantages.



MULTIFUEL CIRCULAR BURNER. Pulverized coal, oil, and gas are efficiently burned singly or in any combination with this burner, thus allowing a wide latitude in use of available fuels.



OIL BURNERS. B&W Oil Burners effect rapid and complete combustion at all rates of fuel feed, using mechanical, steam, or steam-mechanical atomizers.

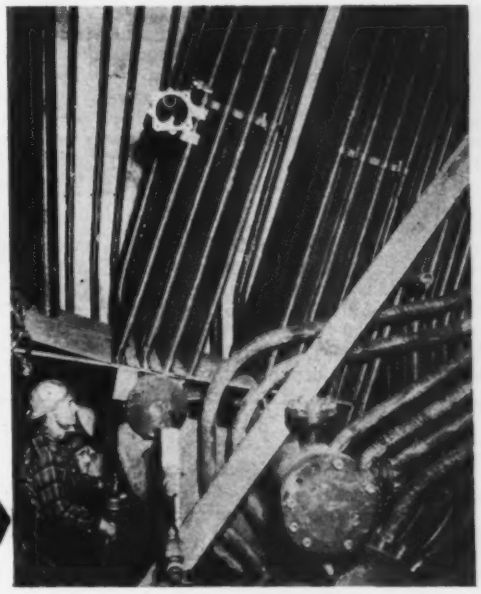


B&W EQUIPMENT for PAPER MILLS...

IN building all the types of equipment shown on these pages, B&W approaches each specific paper mill requirement with an over-all knowledge of both design and application. B&W's broad familiarity with the paper industry for over 60 years pays dividends to mill operators in terms of continuity of service, operating efficiency, and greatest return on investment wherever B&W equipment is used. Consult our nearest office for prompt cooperation in the modernizing of existing plants or in planning for future development.

PRESSURE VESSELS. Sizes and shapes of dependable welded construction for any paper mill requirement can be fabricated by B&W from carbon, alloy, or clad steels. All vessels are x-ray inspected and stress relieved. The seven 30-ft. Pulp-Digester tanks shown above were designed for a working pressure of 150 psi.

TUBES. Seamless and Welded Pressure Tubes are made by B&W in a full range of analyses from low carbons to high alloy steels, including stainless steels, for any high-temperature, high-pressure application in paper mill equipment.



Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
85 LIBERTY STREET, NEW YORK 6, N.Y.

G-3177

$2 Million Planned At Sturgeon Falls

TORONTO — Under a new arrangement with the Ontario government, Abitibi Power & Paper Company will rehabilitate and reopen its Sturgeon Falls, Ont., mill in Northern Ontario. The company has authorized an expenditure of about $2 million to bring the mill, idle since 1930, back into production and it is expected that when the rehabilitation and improvements have been completed the mill will turn out about one hundred tons a day of a special type of corrugated board suitable for lining and packaging.

Rehabilitation was decided upon after a thorough engineering study of the mill and an analysis of the market possibilities for a variety of wood-fibre products.

The latest type of semi-chemical cooking apparatus will be included in the changes to be made at the mill. The existing paper machine will be re-equipped to enable it to dry the daily tonnage of corrugated board.

Abitibi plans to use all species and sizes of wood existing on the limits assigned to the mill, including jackpine, birch, beech, poplar, spruce and balsam, as raw materials for the new manufacturing process. The company also plans to develop the use of sawmill edgings and slabs so that they may make full use of all forest resources in the area under agreement with the government.

For the first time in six weeks common stocks of the Toronto Stock Exchange last week closed higher than the week previous. Common stocks were up 3.8 percent as measured by the Dominion Bureau of Statistics index of 100 common stocks. The biggest jump was shown by the index of eight pulp and paper stocks, which rose 6.8 percent.

During the strike of Minnesota & Ontario Paper Co., which was settled last week, no newsprint operations were affected. Production of insulite was the main item hit by the strike. The strike tied up only the company's mill at International Falls, Minn., and did not affect the Kenora or Fort Frances, Ont., mills. At International 1,600 men have been on strike since June. Settlement of the strike on the basis of a boost in wages of 12 cents an hour is considered to be a win for the workers rather than the operators.

Rumors Continue To Sell Donnacona

TORONTO — Rumors regarding the possibility of the Stern publishing interests of Philadelphia purchasing the stock of Donnacona Paper Co. are still rampant. Latest is that the Stern interests have offered $30 per share for the common. The street is also talking about recent meetings between the U. S. publishing interests and large stockholders in Donnacona. Louis W. Michaels, vice-president and secretary-treasurer of Donnacona, told The Financial Post this week that he knew nothing about the proposed purchase of the company's stock. The only information he had, he said, he learned from newspaper reports.

Capital stock of the present Donnacona Paper Co. initially comprised an authorized 200,000 shares no par value, of which 150,000 shares were issued. A majority of the issued shares was held by Price Brothers Co. Under a reorganization plan in 1932 the shares were divided into two classes, "A" and "B." In 1941 a by-law adopted by the shareholders abolished the two classes and they were merged into one class of no par value common stock. Common stock outstanding as at Dec. 31, 1945, was 376,572 shares.

International Covers Mortgage Obligations

NEW YORK — International Paper Company has deposited with the Chase National Bank of the City of New York an amount equal to the $12,961,000 principal amount of the International Paper Company first and refunding five per cent sinking fund mortgage bonds which mature January 1, 1947.

R. J. Cullen, International chairman, explained, "We understand that Hudson River Power Corporation which has agreed to pay the first and refunding five per cent mortgage bonds at maturity is working actively on plans to raise funds for that purpose. However, these plans have not yet been completed.

"The agreement of November 9, 1945, under which our ten-year two per cent serial bank loan from the Chase National Bank, Bankers Trust Company and the First National Bank of Boston was made contained a provision requiring us to make this deposit with the Chase National Bank as custodian of the collateral securing the loan unless Hudson River Power Corporation by October 1, 1946, had completed arrangements satisfactory to the lending banks for raising funds to pay the bonds at maturity.

"Under our agreement with the banks, the Chase National Bank, as custodian of the loan collateral, will make an immediate offer to purchase first and refunding mortgage bonds at a price equal to principal plus full interest to maturity. All bonds so purchased will be held by the Chase National Bank as part of the collateral for the bank loan.

"We hope that Hudson River Power Corporation's plans for payment of the bonds at maturity will be carried through to a sucessful conclusion."

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending October 5, 1946

STOCKS

	High	Low	Last
A. P. W.	5⅜	5	5
Armstrong Cork Co.	48¼	46	46
Celotex Corp.	28⅜	27⅜	27¾
Celotex Corp., pf.	21	20½	21
Certain-Teed Products Corp.	18¼	17	17
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	49¾	45¾	49¾
Champion Paper & Fibre Co., pf.	106½	105	106½
Congoleum Nairn Co.	28	27¼	27¾
Container Corp. of America	42⅛	40¼	41
Continental-Diamond Fibre Co.	10½	9⅜	9¾
Crown-Zellerbach Co.	28⅜	27½	27½
Crown-Zellerbach Co., pf.	105½	105	105
Dixie Cup Co.	35½	34	34½
Dixie Cup Co.—A	54	52	54
Flintkote Co.	32	28¾	28¾
Flintkote Co., pf.	108¼	108¼	108¼
Robert Gair	7⅞	7½	7⅝
Robert Gair, pf.	19⅛	18⅞	19
International Paper Co.	43¼	41⅝	42¼
International Paper Co., pf.	98½	97¼	98
Johns-Manville Corp.	129	122	122
Johns-Manville Corp., pf.	120	119¼	119¼
Kimberly-Clark Corp.	25¾	25	25½
Mac Andrews & Forbes	34	33½	33¾
Mac Andrews & Forbes, pf.	....	....	....
Masonite Corp.	56½	55	55
Mead Corp.	21⅜	20⅛	21⅜
Mead Corp., pf. 4¼	106	105	105½
Mead Corp., pf. 2	48¼	45¼	46¾
National Container Corp.	28¼	26¼	26¾
Paraffine Companies, Inc.	68	64	64¼
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	19½	18	18½
Rayonier, Inc., pf.	34⅛	33⅜	33⅜
Ruberoid Co.	47	44	46
Scott Paper Co.	46	44½	45½
Scott Paper Co., pf.	103	102	102
Sutherland Paper Co.	41¾	41¼	41¾
Union Bag & Paper Corp.	29⅛	27½	27½
United Paperboard Co.	11½	10½	11⅛
U. S. Gypsum Co.	113½	106	111½
U. S. Gypsum Co., pf.	200	200	200
West Virginia Pulp & Paper Co.	42½	39	41
West Virginia Pulp & Paper Co., pf.	114	114	114

BONDS

Abitibi Pulp & Paper Co. 5s '53	....	....	....
Celotex Corp. 3¼s '60	103¾	103¾	103¾
Certain-Teed Products Corp. 5½s '53	....	....	....
Champion Paper & Fibre Co. 3s '65	....	....	....
International Paper Co. 5s '47	....	....	....
Mead Corp. 3s '66	103⅝	103¾	103⅝

New York Curb Exchange

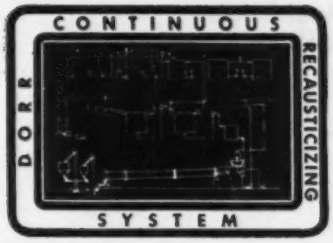
High, Low and Last for Week Ending October 5, 1946

STOCKS

	High	Low	Last
Great Northern Paper Co.	40½	39¾	40
Hummel-Ross Fibre Corp.	15¾	14½	15¼
St. Regis Paper Co.	9⅞	9¾	9¾
Taggart Corp.	7½	7½	7½

BONDS

American Writing Paper Co. 6s '61	....	....	....



When a DORR RECAUSTICIZING SYSTEM *goes in—*

You are all set for

BETTER
Pulp Quality

BETTER
Kiln and Filter Operation

LONGER
Life of Kiln Lining

NEGLIGIBLE
Loss of Soda

The Dorr Continuous Recausticizing System is the heart of a pulp mill's chemical reclaiming department, because it assures the following results which are basic ones in the overall production picture.

1. **A Uniformly Strong and Clear White Liquor**
   This makes it easier to control and to operate the digesters – results in the more uniform production of a pulp with the desired qualities.
2. **A Uniformly Well-Washed Lime Mud**
   This improves filter and kiln operation – increases soda recovery – greatly lengthens the life of kiln linings.
3. **Uniformly Well-Washed Green Liquor Dregs**
   This reduces the soda lost in the dregs to a negligible amount.

These three advantages are engineered into the Dorr System by employing improved methods of continuous slaking and causticizing – by providing adequately-sized thickeners – by giving the lime mud two (2) decantation washings before filtering and burning and the dregs four (4) stages of washing before discarding.

These elements of the Dorr System distinguish it from other systems, offered on "a just as good" basis.

When you think of the Dorr System, think of it in terms of:

Better Pulp Quality • Better Filter and Kiln Operation
Longer Life of Kiln Lining • Negligible Soda Loss

The Dorr recausticizing experts, who handled the installations at the right, stand ready to study your setup – to give you the benefit of an experience that is paying off at 9 out of every 10 new recausticizing systems built since January 1, 1944.

SOME RECENT DORR RECAUSTICIZING INSTALLATIONS

1944
Brompton Paper Co.—Ontario
Marathon Paper Co.—Ontario
Brown Corporation—Quebec
Kalamazoo Vegetable Parchment Co. Ontario

1945
Hummel-Ross Fibre Corp.—Virginia
Pacific Mills—British Columbia
Bloedell, Stewart & Welch—British Columbia
Consolidated Paper Co.—Quebec
North Carolina Pulp Co.—North Carolina
National Container Co.—Florida

1946
Alabama Pulp & Paper Co.—Florida
Gulf States Pulp Co.—Alabama
Hudson Pulp & Paper Co.—Florida
Crown-Zellerbach—Washington
Southern Paper Board Corp.—Georgia
Weyerhaeuser Timber Co.—Washington

1747

DORRCO

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DENVER 2, COLO. . . . . COOPER BUILDING
LOS ANGELES 14, CAL. . . . 811 WEST 7TH ST.

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WESTPORT, CONN.

SUGAR PROCESSING
PETREE & DORR DIVISION
570 LEXINGTON AVE., NEW YORK 22

DORR

RESEARCH ENGINEERING EQUIPMENT

ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE

British Production At 60 Per Cent of '39

WASHINGTON, D. C. — Paper and paperboard production in the United Kingdom in the second quarter of 1946 recovered to about 60 percent of the 1939 level compared to the low point of around 37½ percent during the war years, according to a report to the Department of Commerce. It is expected that several years will elapse before the industry will be able to recuperate fully to the volume of prewar output. The major problem currently and for some time ahead is procurement of adequate supplies of fibrous raw materials, especially wood pulp, which is largely imported and subject to Government policy and controls.

The Paper Control, which functions under the Ministry of Supply, continues to govern the pulp and paper industry in the United Kingdom a year after the close of hostilities. With the former wartime prerogatives still in effect the controls supervision of the industry includes practically all phases of manufacture. This agency is responsible for the procurement, purchase, and allocation to paper mills of all paper-making materials including imports of woodpulp, other fibers, and so forth. It establishes production quotas for the mills every 4 months and licenses the sale to the consuming public of the paper output of each mill together with imports of paper. It likewise is responsible for determining the amount and kinds of paper to be exported. The executive staff of the Paper Control has been largely recruited from the pulp and paper industry and in all policy-making and regulatory procedure works in close harmony with the industry and other government and public agencies. It is expected that the Paper Control will continue supervision of the industry at least through 1946.

Franc-Graham Celebrates A Quarter-Century

NEW YORK — Franc-Graham Paper Company, Inc., this year marks its 25th anniversary in the paper business. Founded in 1921 as a co-partnership between Jerome Franc and Wilfred Graham, the business began its career in an office on Nassau Street and awaited developments in that period of reconstruction before moving along. One year later, in 1922, the company was incorporated and at that time the business was moved to 25 West 15th Street, where it has been located continuously up to the present time.

Expansion has, of course, been necessary during the intervening years and the company now occupies four floors in its building. Jerome Franc has been president of the company since its founding and Henry M. Franc who is secretary and treasurer assumed these offices upon the retirement of Mr. Graham in 1945.

New England Studies Stream Pollution

HOLYOKE, Mass. — New England members of the National Council for Stream Improvement have been told that $270,000 has been spent by the paper industry to aid in ridding waters of pollution caused by pulp operations. Clyde Morgan, president of the Eastern Corporation of Bangor, Me., said the industry is "determined to find a solution to the problem."

Russell L. Winget, executive secretary of the council, said New England has two "hot" problems of paper waste pollution in the Androscoggin and Housatonic Rivers. He said considerable research is being applied to find methods for controlling odors which are a "recurring annoyance to Lewiston, Me."

The Androscoggin River, with a 1200-foot drop in 170 miles, flowing through the heart of Lewiston, offers a peculiar problem, Dr. W. A. Lawrence, Bates College consultant to the council, reported. He said turbulance of the river results in unusual release of odorous gasses. One of them, he added is a marsh gas, or methane.

Dr. W. H. Sawyer of Bates, another consultant, said the river apparently had considerable powers of recovery because fish life appeared to be growing in the autumn of the year after almost non-existence in the summer.

J. Elliott Hale, executive secretary of the Maine sanitary board, told the group that even if the mills shut down along the river, the stream would not clearup for 10 years because of deposits of sewage solids.

Irving Interests Plan Mill On St. John River

KEEGAN, Me. — Canadian interests, which have taken over ownership of the East's largest lumber mill, the Van Buren-Madawaska Corporation, said they would build a pulp and paper mill here or nearby on the St. John River, and continue to operate the lumber mill. Kenneth C. Irving of Saint John, N. B., and associates who operate paper mills at Saint John and Dexter, New York, have purchased the lumber company for an unspecified sum.

Kimberly-Clark Extends Vacation Allowance

NEENAH, Wis. — Kimberly-Clark Corporation on October 1 adopted a new vacation policy for all long- service employes to allow an additional week of paid vacation, thereby making approximately 500 employes eligible for a total of three weeks vacation each year. The action by the K-C executive committee became effective immediately.

In determining vacation eligibility for a third week, years of service on the hourly payroll are to be included if the salaried position held is not of a temporary nature.

OBITUARY

Albert Butler Ritts

STEPHENSVILLE, N. F. — Albert Butler Ritts, executive vice-president of the Van Reekum Paper Company Inc., died suddenly on October 3rd, while a passenger on the American Overseas Airliner en-route to Berlin, which met a tragic end at this point with a loss of all lives aboard. Mr. Ritts was on his way to visit his affiliate office in Amsterdam, where he was to attend a series of business conferences.

Mr. Ritts, who was 43 years of age at the time of his death, joined the organization in 1941, having been formerly associated with the account-records firm of Price Waterhouse & Company where for years he had been a key figure in the major investigations conducted by that organization. In his capacity as executive vice-president of the Van Reekum Company, Mr. Ritts was responsible for the rapid re-establishment of relations with overseas affiliates, and the successful expansion of the export activities of this office in the world markets during the months following the termination of hostilities. Mr. Ritts resided with his wife and son in New Rochelle, N. Y.

William Hamilton MacMenigall

HOLYOKE, Mass.—Word has been received here of the death recently in Durban, South Africa, of William Hamilton MacMenigall, a former Holyoke resident. He was a technical director for the paper industry of South Africa.

Born and brought up in Holyoke, Mr. MacMenigall went to England at the outbreak of World War I and joined the Royal Air Forces. Upon his discharge as a lieutenant after that war, he settled in South Africa where he managed the Premier Paper Co. of Capetown for many years.

Later he became technical director for the paper industry of South Africa and in this position traveled extensively in that country and in the United States. His last visit to Holyoke was eight years ago.

Miles Standish Sawyer

RUTLAND, Vt., Sept. 24—Miles Standish Sawyer, 78, retired businessman, active in the wholesale paper business and prominent in civic affairs, died yesterday afternoon at his home after an illness of two years.

Long active in community and charitable affairs, Mr. Sawyer's chief interest during the later years of his life was the Rutland hospital and he gave much time to its improvement and development as president and a member of the board of directors for 15 years. He held the office of president at the time of his death.

Shortly before the turn of the century, he became affiliated with his uncle in the wholesale paper business operated under the name of H. A. Sawyer and company.

How to Get More out of Your Chemicals

By maintaining constant vigilance in manufacturing and shipping uniformly high quality chemicals, we have endeavored to serve the pulp and paper industry. You can always depend upon Hooker for the quality you want in pulp and paper chemicals.

Another way that Hooker has been helping pulp and paper makers is through the services of its Technical Staff. The close cooperation of Hooker chemists with pulp and paper makers is well known in the industry. The results of this relationship are found in the technical papers and bulletins Hooker has printed and offers to all those interested. These bulletins suggest the way to improved processes, greater economies and higher quality production for you.

They cover many phases of your operations and should be of value to your present operations as well as for your plans for expansion. Some of the Hooker bulletins of interest to the paper industry are listed below. Copies will be sent you when requested on your letterhead.

HOOKER BULLETINS

BULLETIN 201—*Process and Equipment for Making Bleach for Use Without Settling.*

BULLETIN 208—*Prevention of Suck-backs in Chlorine lines.*

BULLETIN 211—*Chemistry of Bleaching Chemical Wood Pulps.*

BULLETIN 234—*Lime-Chlorine System in Preparation of Calcium Hypochlorite.*

BULLETIN 236—*Importance of pH and Catalysts in Bleachery Operations.*

BULLETIN 241—*Bleaching Gumwood Sulfate Pulp.*

BULLETIN 242—*Production and Use of Unsettled Bleach Liquor.*

BULLETIN 243—*Procedures and Brightness Grades in Bleaching Sulfate Pulps.*

HOOKER ELECTROCHEMICAL COMPANY

6 Union St. NIAGARA FALLS, N. Y.

New York, N. Y. Wilmington, Calif. Tacoma, Wash.

Caustic Soda Chlorine Muriatic Acid Sodium Sulfide

HOOKER CHEMICALS

8434

Car Shortage Halts Hoosier Paper Trade

INDIANAPOLIS, Ind. — Little change was seen in the past week in the local paper situation, which has been none too good for these many weeks. Just now the trade is faced, apparently, with a car shortage, but local executives say production is behind schedule and likely will remain so for a long time to come. It is doubtful if the paper trade in this section has been faced with more serious troubles in its history.

Demand for all grades continues heavy and the backlog of orders continued to mount. Manufacturers and jobbers are rationing their customers because they have to. The tissue situation is extremely bad. Lines of customers crowd the stores for tissues of all kinds. In fact they rival the meat lines.

If other building materials were available, the shortage in building paper and roofing would be acute. As it is, however, the local distributors seem to have sufficient to supply the trade. But, some new building is being authorized for which priorities are being given and the situation in building paper and roofing could become acute with little warning.

Newsprint also was in demand, with local publishers turning down advertising to hold pages down. There is hardly a metropolitan paper in Indiana that could not increase its pages at least 50 per cent if paper were available. Fine paper also was in demand with supplies strictly limited.

Rag demand continued steady to strong during the week with new cotton cuttings mostly in demand, though all grades were acceptable. Everything was at ceiling prices.

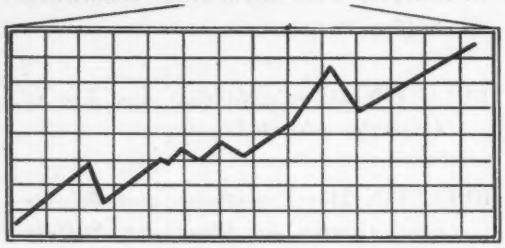
A heavy demand also continued for waste paper with local warehouses unable to supply the demand.

Heselton Hopes Work Will Be Resumed on Dam

HOLYOKE, Mass. — Hope that construction work on Tully Dam and upon riverbank protection for paper mills in the Holyoke area will be prosecuted in the near future was expressed in Washington by Congressman John R. Heselton (R) of Deerfield. Mr. Heselton based his statement on the reported decision of President Truman to review the administration order holding up the expenditure of money recently appropriated by Congress for flood control work.

"I hope that projects already started will now be gone forward with," said Heselton. "I am hopeful that the proposed delay in work at Holyoke and at Tully Dam will be eliminated." Mr. Heselton conferred last week with Chairman Whittington (D. Miss.) of the House Flood Control committee after Whittington had returned from seeing the President.

THERE MUST BE A REASON



• Mill operating men are hard-boiled—and they should be. They have to be shown *proved* performance before deciding on new equipment. Nichols can point to almost 4000 Vortraps in successful operation to back up their claims. Vortraps pay for themselves in materially reducing rejects and "seconds"; saving machine wires and screens and reducing wash-up time by eliminating dirt and abrasive grit from pulp and paper-making stock. They are economical to install and maintain, take up little space and have no moving parts.

Write for information.

NICHOLS

ENGINEERING & NERCO RESEARCH CORP.

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Midwest Trade Feels More Optimistic

CHICAGO—A feeling that the Government would soon attempt to do something about the OPA situation to insure more importing of pulp into this country seemed to be more or less in evidence in the Chicago market this week. The belief persists that ceiling prices are the vehicle now causing much European tonnage to be sent to South America and other spots where ceilings are no headache. Satisfaction was also expressed here over the sharp criticism voiced against certain OPA policies by Congressional groups studying the neswprint situation and the paper shortage in general.

Meanwhile, locally, the industry began to take stock of holiday requirements and found that, all in all, there was a likelihood of more goods of this type than last year. Gift wrapping and other requirements were expected to be very heavy with suppliers able to take care of possibly 40 to 50 per cent of the demand as compared to 25 to 30% one year ago. Book and cover papers were reported extremely "tight" in the Chicago area as were the mimeo and other lines so long ago characterized as "military" and still getting plenty of play in that field. There continued to be a rather substantial area of dissatisfaction over OPA ceiling and decontrol policies thus far.

Waste paper collections held up fairly well although showing some weakness in certain spots. Inventories at the mill level, however, were said to be adequate for the time being. Roofing rags were reported at top ceilings but the second hand bag market was said to be quiet.

NEPCO Two Mile Properties In Annexation Proposals

PORT EDWARDS, Wis.—A petition to annex Nekoosa-Edwards Paper Company properties in the town of Grand Rapids to the village of Port Edwards is before the village board, and a proposed ordinance to include the territory within the village limits may be considered at the next board meeting on October 8.

Action to add the Nepco holdings in the Two Mile school district to Port Edwards followed inception of a movement by Two Mile residents to circulate petitions for annexation of the area to the city of Wisconsin Rapids, with the intention of taking as much Nepco property as possible for its tax revenue into the city.

The Nepco holdings, for which the annexation has been asked, are nearly all in the Two Mile district and include Nepco lake, 2,000 acres of reforested land and the east abutments of Centralia and Port Edwards dams. The Nepco utility serves part of the district. The company paid a tax of $13,114.92 last year.

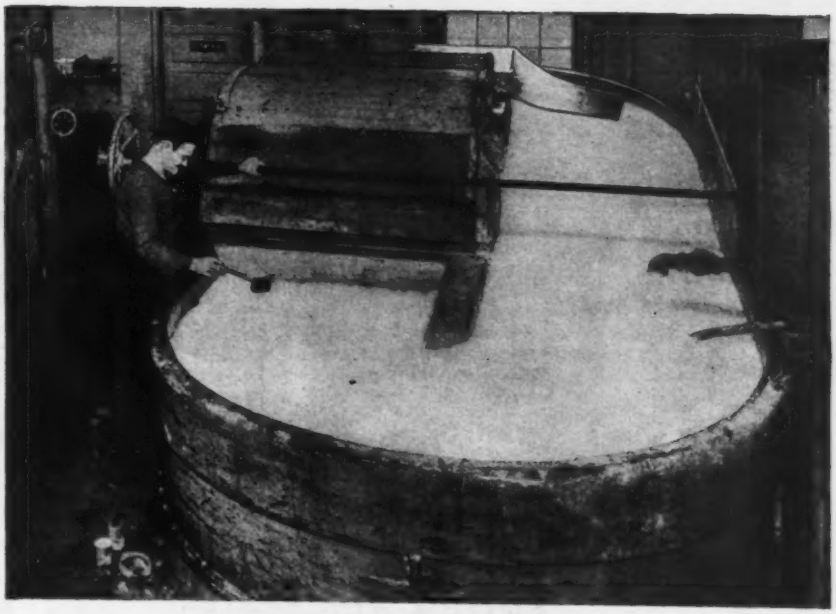
SPECIFY "GENERAL CHEMICAL"

for quality papermaking chemicals

GENERAL CHEMICAL COMPANY
products for the paper industry

- Aluminum Sulfate (Standard and Iron Free)
- Copper Sulfate
- Muriatic Acid (Hydrochloric)
- Sodium Fluoride
- Sodium Silicate
- Sodium Metasilicate
- Glauber's Salt (Crystal or Anhydrous)
- Salt Cake
- Sodium Sulfide
- Sodium Hyposulfite
- Sodium Sulfite (Anhydrous)
- Sodium Bisulfite (Solution or Anhydrous)
- Disodium Phosphate
- Trisodium Phosphate
- Tetrasodium Pyrophosphate
- Sulfuric Acid
- Nitre Cake (Sodium Bisulfate)
- Nitric Acid

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY



Making quality paper depends to a large extent on the quality of the chemicals used. General Chemical Aluminum Sulfate, for example, either in the Standard or Iron Free grades, will help maintain quality in your paper from the start. General Chemical's carefully controlled production methods insure "Alum" of uniform quality and concentration, and a low percentage of impurities.

Next time, specify these quality General Chemical products for *your plant:*

ALUMINUM SULFATE

Standard—Lump, Ground 99% thru 8 mesh, 95% thru 10 mesh; Powdered, 95% thru 100 mesh.

Iron Free—Lump, approx. 2½"; Ground, thru 8 mesh.

SODIUM SILICATE

Solutions: from 38°—60° Baumé

Appearance: Opalescent to clear

Wt. Ratio (Na_2O to SiO_2) from 1:2.00—1:3.40

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Albany • Atlanta • Baltimore • Birmingham • Boston Bridgeport • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh Providence • San Francisco • Seattle • St. Louis • Wenatchee • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

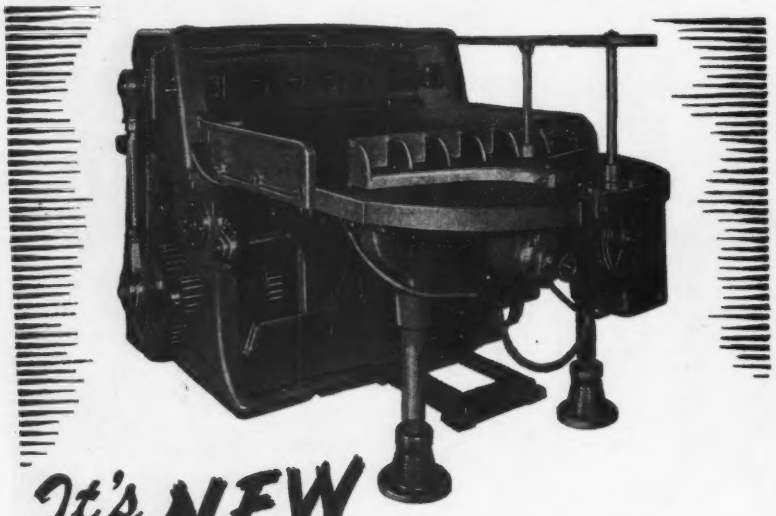
Sidney Roofing Moves Executives to New Posts

VANCOUVER, B. C.—Several changes in the executives of the Sidney Roofing & Paper Company Limited have been reported by R. W. Mayhew, president. R. Logan Mayhew, managing director of the company and its subsidiary, National Paper Box Limited, Vancouver, and Fibrerock Insulation Limited, Victoria, has been appointed vice-president and also managing director of the two subsidiary companies.

A. Welch has been appointed general manager of the Sidney Roofing and will continue to occupy the position of secretary-treasurer of the company and its subsidiary.

P. W. Field, who has been manager of the Vancouver branch of the Sidney Roofing and a director of the company, has now been appointed general sales manager in charge of all sales, both domestic and export, and will move to Victoria head offices.

A. T. Anthony, of the Vancouver sales staff, has been named as district sales manager and placed in charge of the Vancouver office. At the same time announcement is made that in future the entire mainland area of British Columbia will be serviced from Vancouver.



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SMITH & WINCHESTER
MODEL "E"
UNDERCUT TRIMMER

A NEWLY designed Undercut Trimmer retaining the outstanding features of the Smith & Winchester Standard Undercut with many new features, for fast, safe, accurate, more convenient operation. Features include: Heavy one-piece base frame; hinged front table to take away stock from cutter after cut; knife, to cut stock, raises from below the table; anti-friction bearings on drive shaft; disc type friction clutch; back gauge operated by variable speed, reversible motor for close setting; push button controls; illuminated index tape.

The Model "E" Undercut meets the needs of the modern finishing department for high production, accurate trimming and safe operation.

Investigate the new Model "E" for your peacetime needs. Bulletin giving full particulars mailed on request.

Makers of PAPER BAG and PAPER MILL MACHINERY

THE SMITH & WINCHESTER
Manufacturing Company
SO. WINDHAM, CONN.

Serving the Paper Industry Since 1828

Gilbert Staff Fetes Retiring Veterans

MENASHA, Wis.—Executives and supervisors of the Gilbert Paper Company attended a dinner at North Shore Golf Club Friday evening, September 27, in honor of three retiring employes who have served the company a total of 141 years. The employes are Charles Hanke, Henry Ellinger and Alex Weber, all of Menasha.

Mr. Hanke, who has been with the company 49 years, has been a foreman for the last 20. He started as a helper in the calender department. Mr. Ellinger, who also has served 49 years, was boss calenderman for many years. He also began employment in 1897 as a calender department helper. Mr. Weber, with 43 years of service, started in the paper machine department in 1903. He was air dry tender.

Five other employes who have completed more than 40 years of service with the company also were present at the dinner: Frank Adrian, 40 years; Frank Kozlowski, 44 years; Bernard Monarski, 46 years; Henry Vander Hyden, 47 years, and George Rank, 52 years.

An informal program was held after the dinner and gifts were presented to each of the three guests of honor.

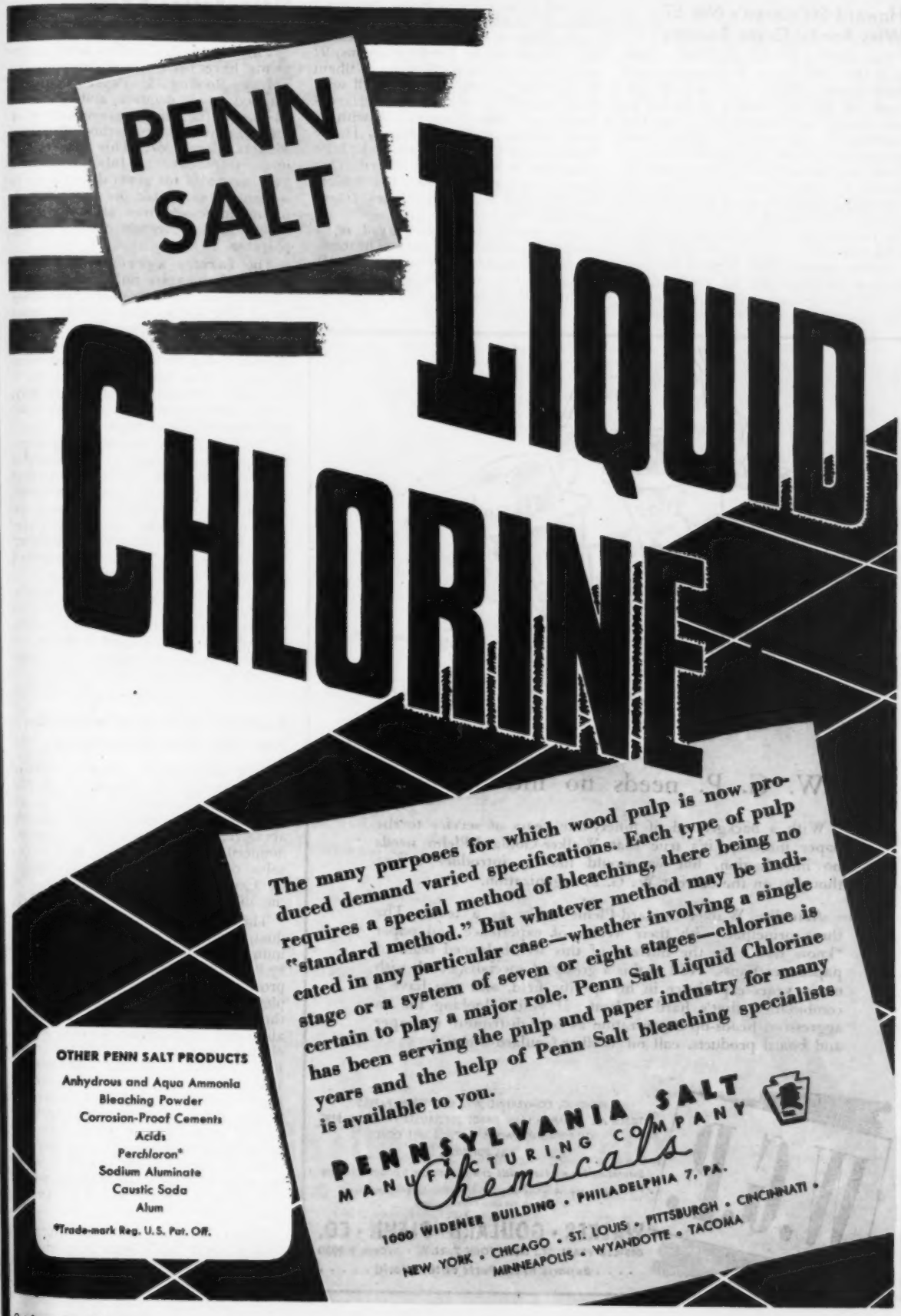
Crescent Paper Opens Champaign Warehouse

CHAMPAIGN—This Illinois city, home of the University of Illinois, and strategically located in the central part of the State, is now the home of a branch warehouse being operated by the Crescent Paper Company of Indianapolis. The new warehouse was reported opened for business late last month and will be managed by Harry Kruse who will have charge of the warehouse operations on packaging supplies and both fine and coarse papers. The Champaign warehouse represents the first effort of Crescent to develop branch warehousing and the location and setup of the mid-Illinois arrangement is expected to turn into a profitable venture for the rapidly growing organization.

Webber and Smith Join Their Sales Experience

NEW YORK—Formation, on October 1st, of a new company, located at 52 Vanderbilt Avenue, specializing in pigment and chemical sales and technical service, was reported this week by Robert I. Webber and Holland W. Smith, Jr.

Mr. Webber and Mr. Smith are well-known in the Metropolitan Area, and as "Webber and Smith," will continue the sale of Atomite, Lesamite, and other Thompson-Weiman extenders, maintaining the same type of service which the partners, as individuals, have offered. Additional pigments and chemicals will be handled as well.


PENN SALT
LIQUID CHLORINE
The many purposes for which wood pulp is now produced demand varied specifications. Each type of pulp requires a special method of bleaching, there being no "standard method." But whatever method may be indicated in any particular case—whether involving a single stage or a system of seven or eight stages—chlorine is certain to play a major role. Penn Salt Liquid Chlorine has been serving the pulp and paper industry for many years and the help of Penn Salt bleaching specialists is available to you.
OTHER PENN SALT PRODUCTS
Anhydrous and Aqua Ammonia
Bleaching Powder
Corrosion-Proof Cements
Acids
Perchloron*
Sodium Aluminate
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NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • MINNEAPOLIS • WYANDOTTE • TACOMA

Howard Stevenson's Net 67 Wins Annual Crane Tourney

DALTON, Mass.—Edward Stevenson won the 1946 Crane & Company golf tournament with a low net 18-hole score of 67. He shot a gross of 82 and carried a 15-stroke handicap. The tournament, an annual affair, was played off at the Wanconah Country Club and followed by a steak roast at Mount Pleasant Lodge in Windsor. At the roast which followed Bruce Crane presented the awards to the winners of the tournament. John Persip of Pittsfield catered.

Other winners are: Second low net, Rudson Bellinger, 71, with a handicap of 30; low gross score, John Boraski, 76; second low gross, William Johnson, 78; low gross for nine holes, Benjamin Sullivan and Arthur Crane, both 41; low net for nine holes, Elek Boraski, 30½; most bogies, Frank Williams, 9; most fives, Edward Wolcott, William Popuar and Clarence Decker, all with 9; most sixes, Edward O'Brien, Harold Dakin and John Duquette, all with 9; most sevens, Ralph Williams, Harry Warden and Clarence Wellspeak; high gross for 18 holes, James Merrill, 155; high gross for nine holes, Tex Anderson, 82; high net for nine holes, Harry Stedman, 64.

The tournament was played on a medal play handicap basis. The committee in charge consisted of E. P. Stevenson, George Bauman, E. J. O'Brien, E. A. Wolcott, Gardner Rudd and Clarence C. Decker.

W. G. P. needs no introduction

With a background of ninety-one years of service to the paper industry, it's true that Walker-Goulard-Plehn needs no introduction, but we would like to introduce a few thoughts on the current W. G. P. organization.

Actually, Walker-Goulard-Plehn works as a team. The three principals with their wealth of experience and paper "know how" are the nucleus of this well-balanced team of paper merchants. Add to this a group of specialists each with many years experience in his specific field, and you have a combination that's hard to beat. If you're looking for an aggressive, heads-up organization as your distributor on paper and board products, call on Walker-Goulard-Plehn.

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Sidney Roofing & Paper Signs New Work Contract

VANCOUVER, B. C.—New labor agreements have been signed between the Sidney Roofing & Paper Company Limited of Vancouver and Victoria, B. C., and the union representatives of the International Brotherhood of Paper Makers, Local 367. This new agreement, retroactive to July 1st of this year, provides for general increases to all employees of 12c per hour. In addition, increases over and above 12c are granted to certain classes of employees.

The former agreement was not scheduled to expire until October 15th of this year. Increases were necessary as of July 1st because working hours were then reduced from 48 to 44 hours per week by Provincial law. In other British Columbia pulp and paper companies, where union contracts automatically came up for renewal in May, 1946, increases had been granted to the employees of those mills.

The union was successful in negotiating many clauses more favorable than the standard agreement in effect elsewhere. Some of these were additional statutory holidays, and continuance of a sick leave plan which provides for payment to employees during sickness up to a specified number of days per year.

The base rate in effect under the new agreement is 77 cents per hour. In addition, it is calculated that the welfare plans for the benefit of employees amount to the equivalent of an additional five cents per hour.

Norton Conference Introduces New Alundum 32 Abrasive

WORCESTER, Mass.—A new abrasive which tests have proved to be the greatest development since Norton introduced the original fused alumina abrasive, alundum, in 1901, was announced at the beginning of a week's sales conference at Norton company by George N. Jeppson, chairman of the directors.

The abrasive, trademarked 32 alundum, is an entirely new type of aluminum oxide abrasive—made differently by a Norton-invented and patented process. Each grain is a single complete crystal, not crushed to size as in the former method of manufacturing abrasives. It is produced in the Norton electric furnaces at Chippeaw, Ont. Each crystal is strong and solid in shape with many sharp points, resulting in a grinding wheel of faster cutting, without burning, requiring fewer dressings and longer wheel life. The company is in production on the new abrasive, and grinding wheels in which the new abrasive is bonded are now in operation in many manufacturing plants.

Ralph M. Johnson, vice-president and general sales manager, abrasive division, presided at the opening conference.

The BROUGHTON
S-10-H OSCILLATING SHOWER
for
Cylinder Moulds, Thickeners, Felts, Wire and Vats
equipped with
NEW HYDRAULIC OSCILLATION

Pat. November 3, 1942—2300909
(Other Patents Applied For)

The same water drives the oscillator that passes through the shower. No grease or oil. Everything water lubricated. Compact and easily installed.

Requires less than 7 gallons per minute of FRESH FILTERED water per 100" of wire to do a thorough job of continuous cleaning.

Savings on cylinder machines in excess of 200,000 gallons each 24 hours.

Can be equipped with non-oscillating adjustable deckle edge jets.

Same shower can be applied to any position where a shower is necessary.

We are also manufacturers of S-13-H Showers for cleaning head box cylindrical screens.

Bulletin upon request

A. E. BROUGHTON & COMPANY
Manufacturers of Oscillating Showers, and Unit Vacuum Controls for paper machine suction boxes.
GLENS FALLS, N. Y.

Australia Tightens Control On Cigarette Paper Traffic

PERTH, W. Australia—To overcome the serious shortage of cigarette papers, licenses are now being issued for their importation, and an embargo placed on their export. Shortage is particularly bad in South Wales and Victoria, but in the former State untrained operatives are now being engaged, and it is reported that in one factory they are manufacturing 45,000 packets a day. Inquiries as to the amount of papers now in bond show that less than 500,000 books are held in Sydney, and these are for shipment to Australian troops in Japan.

Customs inspectors and detectives recently seized nearly 2,500,000 cigarette papers and arrested four airmen in Melbourne, charging them with having stolen the paper from the Commonwealth. It is alleged that a R.A.A.F. printing plant has been used to manufacture the completed papers, a process which is a breach of the excise regulations.

Tasmania Salvages Chips

Chips which are to be found in abundance in the forests adjacent to the timber mills in Tasmania are now being collected and shipped in bulk to the paper mills where they are to be turned into pulp. It is claimed that it will be an economical proposition to reclaim all such chipping waste.

Commonwealth Bank statistics for the month disclose that there was a rise in factory sales of paper throughout the Commonwealth.

Imperial Chemical Industries of Australia and New Zealand, a firm which manufactures a number of chemical products of interest to paper manufacturers, report a net profit of $1,481,750, at par exchange, for the year, a drop of some $397,531 against the figures for the previous twelve months. Dividend, which has stood at 5 per cent since 1941, has been reduced to 4½ per cent.

The New Zealand Manufacturers' Federation has again proposed the establishment of a Tariff Board or a Trade Control Commission as an alternative to the existing cumbersome import licensing system of trade control, but the Dominion Government has decided to defer consideration of this proposal "to a later date." But in Australia the Division of Import Procurement has ceased to exist, and all import licensing matters will now be controlled by a Central Import Licensing Branch directly responsible to the Comptroller-General of Customs.

Annual output of Associated Pulp and Paper Mills, Ltd., is now said to be from 17,000 to 18,000 tons, of an approximate value of $4,800,000. About 750 workers are employed at the mill, and papers manufactured include M.F. printings, S.C. printings, cream laid and wove writings, white bonds, offset printings, drawing cartridge, antique wove and laid, duplicating, azure laid account book papers and hard and soft sized blotting papers.

Paper Manufacturers Extend Line

Australian Paper Manufacturers, Ltd., are now making a wide range of cardboards ranging from the cheapest form of carton board—chipboard—to high quality coated boards for special purposes. A fair range of papers is also turned out, but main lines here are bag and wrapping papers.

It has now been revealed that during the war period Australian Paper Manufacturers, Ltd., made materials for the manufacture of gun cotton, a war necessity which at one period became at a low ebb owing to the failure of a shipment to arrive from England.

Total exports of paper from Australia during the financial year 1944-45 were valued at £473,000 (US $2,270,400), compared with US $1,800,000 for the previous twelve months.

South Australia's pulp and paper industry continues to show a gradual improvement. Industry was started in this State in 1941, and during the financial year 1941-42 some 758,000 feet of local softwoods were supplied to the mill. But during that year a further 8,696,503 super feet of pulp wood from local softwood plantations was exported to Victoria.

Among the trade marks recently registered was: Words "Life Leaf" for paper (except paper hangings), stationery and bookbinding, and including loose-leaf ledgers, books, files and binders. Word is featured in a square design. Registered by Lamson Paragon Ltd., Richmond, Voctoria.

The Commonwealth Statistician has just made available details of paper imports for the month of April. These show that newsprint (in rolls and sheets) amounted to 7,431 tons, an increase of 2,672, tons over the previous month's figures. Imports of other papers during the month were: Imitation art, 23 tons (United Kingdom); other coated printing papers, 63 tons (United Kingdom); glazed imitation parchment, 21 tons (Sweden); lithographic, machine glazed or one side calendered, 37 tons (United Kingdom); other printing papers, 54 tons (United Kingdom), 856 tons (Canada), 50 tons (United States) and 2 tons (Sweden).

Figures just made available by the West Australian Statistician show that imports of paper and stationery into that State during the six months ended 31 December, 1945, were as follows: Pulp, paper and board, $1,321,493 and paper manufacturers and stationery, $788,870.

Export Markets Ask Better Packaging

CHICAGO — Reports from South Africa show some interesting facts which are being weighed locally by package and container industries. Recently, a Chicago Tribune correspondent, cabled a story to the effect that importers of American goods are taking heavy losses from faulty packing. Goods are pouring in, says the reporter, but merchants are quoted as saying that American packaging is "disgraceful because there is no difference between packaging for the American domestic market and the export trade." Comparisons are made with good packing methods of the British, and insurance companies are said to be taking a grave view of the situation created by "indifferent American packing." One large merchant is quoted as saying that "Americans are carton crazy. They don't realize that packing methods suitable for American railroads and trucks are unsuitable for overseas shipment."

All of this is taken with real concern by some quarters where it is realized that the Union of South Africa is an important field for American capital, industry and businesses with gold mining the biggest industry in the country, producing 60 per cent of the world's gold. South Africa is credited with being a large export market for automobiles, industrial equipment and manufactured goods of all kinds which explains why the American industrial leaders are so anxious to retain the market and probably genuinely concerned over what is considered as an unbiased report from unbiased sources.

Calco Names Acaster To New Responsibility

BOUND BROOK, N. J.—S. C. Moody, vice-president and general manager of Calco Chemical Division, American Cyanamid Company, has named Horace D. Acaster to the newly created office of manager of industrial relations of the Calco organization. Mr. Acaster studied chemistry at Cooper Union, and business administration at Rutgers University. He was associated for some years with the former E. C. Klipstein & Company, South Charleston, West Virginia, and later as plant manager with the Atlantic Dyestuffs Company. He came to Calco in 1926 as a production supervisor.

Mr. Acaster has undertaken several important assignments for the American Cyanamid Company and its subsidiaries. He spent several years in South Africa, constructing and operating a plant for the American Cyanamid Company. He was made Project Engineer of the Chemical Construction Company, an American Cyanamid subsidiary, after his return to this country in 1942, and since 1943 has been plant manager of the Stamford Laboratories.

CIBA Dyestuffs

FOR BEATER.. CALENDER.. COATED PAPERS

DYESTUFFS • CHEMICALS • INTERMEDIATES
CIBA
COMPANY INC.
Greenwich & Morton Sts.
NEW YORK
BOSTON · CHICAGO · MONTREAL · CHARLOTTE
PROVIDENCE · SAN FRANCISCO · PHILADELPHIA
VAT DYES OF THE DOW CHEMICAL COMPANY

SULPHONATED TALL OIL

An AHCO PRODUCT

Better Than Castor Oil For All Coated Papers

For more even penetration and an excellent overall finish, whether coating by brush or machine, paper manufacturers are now using sulphonated tall oil instead of sulphonated castor oil.

The much lower cost of sulphonated tall oil is only one factor governing this current, growing usage. Better brushing and better finished appearance, without the mottled look sometimes caused by the uneven penetration of sulphonated castor oil, are gained by use of sulphonated tall oil in relatively small quantities.

Perhaps the greatest advantage of sulphonated tall oil is that it can be used safely in relatively large quantities to obtain specific desired results. The use of sufficient quantities of other oils to obtain these results would often definitely ruin the paper. So for reasons of less cost and less need for caution, sulphonated tall oil can be used more freely than sulphonated castor oil.

Available in 55 gallon drums. Write for test sample.

ARNOLD, HOFFMAN & CO., INC.

MANUFACTURING CHEMISTS

ESTABLISHED 1815 • PLANTS AT DIGHTON, MASS. AND CHARLOTTE, N. C.

PROVIDENCE, RHODE ISLAND

NEW YORK BOSTON PHILADELPHIA CHARLOTTE

Engineering Holds Interest of Milwaukee Conference

(Continued from page 67)

process load then the ideal situation has been attained.

It is believed that the application of process steam and power is just as important as its production, therefore, the complete cycle must be analyzed in each case before a selection is made of the proper pressure to use. Improper application or wasteful use of process steam will offset efficient production in the power plant.

Hans Dahlstrand of Allis-Chalmers talked on "Turbine Installation and Maintenance."

Mr. Dahlstrand's paper described various types of steam turbines condensing, non-condensing, condensing bleeder and non-condensing bleeder. These types of steam turbines are generally used in the power plants of industrial concerns requiring steam for heating and process work as well as generation of power. It covers a detail description of certain vital parts of the steam turbine. The regulating and control mechanism is treated in detail to give a clear picture of the performance of these vital elements. The use of higher pressure and temperature steam in present power plants by installing high back pressure units is briefly covered. An approximate method for estimating the performance of the different types of units is also shown by diagrams. From these diagrams an estimate may be made of the economies and the size unit required. The importance of maintaining the steam turbine in good operating condition is stressed as only in this way can the maximum reliability and efficiency be obtained. Definite methods for the guidance of the operating engineer are indicated. These methods consist of a continuous record during operation of all conditions existing in the power plant. Thorough inspection of the steam turbine should be made periodically and these inspections should cover all parts likely to require attention. Suggested rules are given covering this inspection as well as precautions to be used in reassembling the unit together with keeping a complete record of the condition as this record will be of value at subsequent inspections.

Mr. Warner closed the program with a provocative paper entitled "Is B.t.u. Accounting Worth While." A prepared discussion was offered by E. P. Gleason of the Nekoosa-Edwards Paper Company which was followed by a "Free-for-all" from the floor. Mr. Warner's recommendation was a challenge to the traditional manner of accounting for industrial steam distribution.

The Beloit Visit

Ou Thursday afternoon a special train carried about 250 TAPPI men to Beloit, Wis., where they were guests of the Beloit Iron Works. As might be expected the Beloit organization proved to be top-flight hosts. Small groups were taken by guides through the plant where a large number of machines and parts were under construction. The interest of everyone was evident and the occasion turned out to be a veritable field day for paper mill engineers. Each member of the party carried a large Beloit TAPPI-Day Identification plaque and received a souvenir booklet. The cornerstone for the new extension was fittingly exhibited and registration cards made out by the visitors were collected to be deposited in the cornerstone for review at some remote future date.

Part of the TAPPI group that visited plant of the A. O. Smith Corporation, October 4

Following the plant inspection the party was transported to Rockton, Ill., where a delightful evening was spent at the Wagon Wheel. Following the dinner brief remarks were made by representatives of the gustse and of the Iron Works. The guests who spoke were G. W. E. Nicholson, R. G. Macdonald, C. R. Van de Carr, Vice President of the Mead Corporation, Mr. Pullim, Chairman of the Board of Pusey & Jones Corporation and Mr. Jerrardi of Black - Clawson - Shartle - Dilts. Messrs. Neese, Wood and Hogt represented the Beloit Iron Works and J. A. Fisher, President of the Beloit Box Board Company made a few remarks. The TAPPI group then returned on the Milwaukee Road to Milwaukee.

Mill Design Session

On Friday morning, October 4th there was a technical session devoted to Mill Design and Economic Aspects. Milton Jacobs presided as chairman.

W. C. Bloomquist of the General Electric Company, Schenectady, N. Y., presented a paper on "High Voltage Distribution in Paper Mills."

This paper described the important factors to consider in expanding and modernizing the power-distribution systems of paper mills. The keynote throughout is sound engineering principles combined with the proper consideration of the over-all system economics.

Emphasis has been given to the selection of the proper generation, distribution, and utilization voltage levels, with data for economic comparisons. Included is a chart which is useful in selecting the proper generation voltage for new mills as a function of the mill electrical capacity and which is also useful in determining the extent to which existing mills can expand their power facilities.

The load-center system of power distribution—its principles, economic advantages, and use in paper mills—was fully covered.

Attention has been given to methods of distributing power to loads requiring a high degree of power-service reliability. The mertis, limitations, and relative costs for several basic arrangements are discussed.

The trend in system operation is towards a grounded system and since this practice is relatively new in paper mills, the subject is duscussed in detail. The operating advantages with a grounded system are well covered. Several methods of establishing a grounding source are shown by simple diagrams.

Special attention was given to the economic advantages of capacitors for small sized mills. Data was included showing the system capacity released by power-factor improvement and the economic limits of capacitors for obtaining additional system capacity.

The next speaker was John Stadler, Consulting Engineer, Montreal, P. Q. Mr. Stadler talked on "Trends in Mill Design." Mr. Stadler said, in part:

"Since new construction is generally a capital expenditure which has to be amortized in a given time, a careful study is required. Amortization tables on buildings give a life of from 12 to 80 years but it is not always the building giving the longest life that is most economical. It must not be overlooked that for the production of pulp, paper, or paper products, special machinery is required and in many instances a change of process quite often calls for a complete redesigning and rarrangement which generally can not be done

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without changing the building, therefore a less costly building may be of advantage.

"From a thermal efficiency standpoint, steel and reinforced concrete alone will not produce a cheap building for pulp and paper mill use in cold climates, therefore it is necessary to make further investigations to produce a cheap building for use in locations where moderate and low temperatures prevail.

Prime consideration has to be given to labor cost. No matter what a mill is producing, with the present tendency for higher wages, a new mill or modification of existing mills must have lower production cost per unit of production.

"Thermodynamics and chemistry are most important factors in new mills and even existing ones will have to give more attention to that subject. It is suggested that the economies that can be effected by carefully utilizing all the heat that it is possible to extract from the waste water before it is discharged into the sewers be considered as there are but few mills that measure all their effluent (waste waters) methodically and accurately and relate same to the overall heat balance of the mill.

"The time when the practical operator controlled processes by visual inspection or by smell or color, without records produced by reliable instruments, is past as instruments for all operating requirements are now available and in many instances such instruments not only record but control functional operations closer and more accurately than is possible by manual performance.

R. W. Porter of Chemical & Metallurgical Engineering gave an interesting paper on the "Economics of Mill Instrumentation. Mr. Porter pointed out the necessity of obtaining factual information regarding continuous operation in order to make decisions regarding improved methods of operation.

W. M. Huffnagel of the Link Belt Company, Chicago, Ill., discussed "Chain and Its Application in Pulp and Paper Mills."

Luncheon and Plant Visits

At the Friday luncheon George R. Wadleigh presided as chairman and presented the guest speaker—C. E. (Dan) Patch of Morton C. Tuttle Company, Boston, Mass., who chose for his subject "Watch Your Waist Line." As indicated by the title this homely and vital subject was treated in the lighter vein of Dan Patch's native New England humor but every anecdote was a lesson in waste prevention in industry.

In the afternoon organized visits were made to the plants of the A. O. Smith Corporation and to the Allis-Chalmers Mfg. Corporation, where guided tours provided an opportunity to see equipment of particular interest to the pulp and paper industry. Following the plant visits several visited the Pabst Brewery in Milwaukee and others were guests at a cocktail party given at the Pfister Hotel by the A. O. Smith Corporation.

In past years the preparation and administration of a fall meeting of the Technical Association was taken care of by a local section or by a large local committee. The Milwaukee Engineering Conference was arranged largely by chairmen of the committees of the Engineering Division, the national Secretary and locally by R. K. Prince of the Allis-Chalmers Mfg. Company, H. A. Schmitz, Vice President of the A. O. Smith Corporation and Harry C. Moore, Vice President of the Beloit Iron Works.

The Conference evidently filled a long wanted place in the industry. Because of travel and hotel accommodation difficulties no attempt was made to encourage a large attendance. However, an unusually fine representation of the cheif engineers and their associates attended and for the most part expressed approval of the program and the need for such an annual conference.

Kalamazoo Superintendents To Meet October 16

KALAMAZOO — The next meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association will be held Wednesday evening, October 16, at the Park-American Hotel. Dinner will be served at 6:30 P.M.

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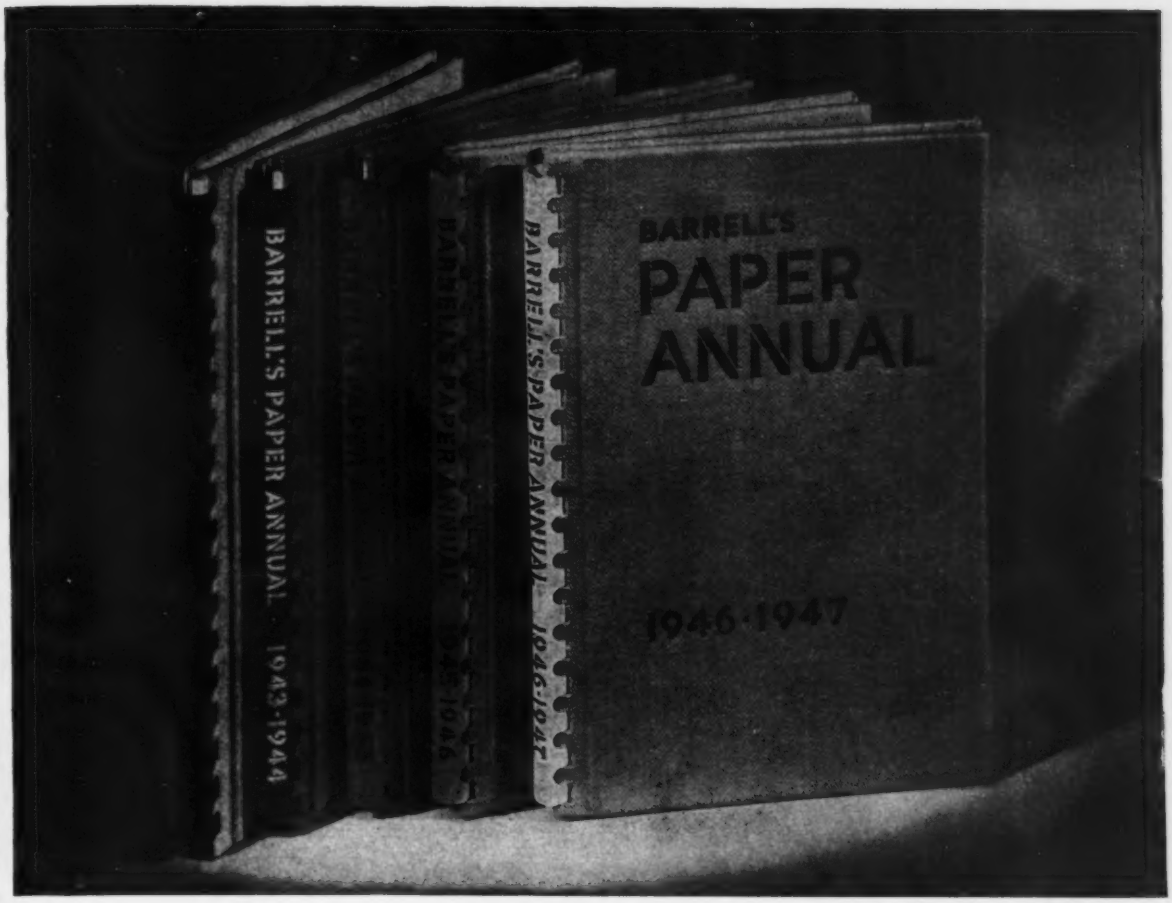

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THE PAPER INDUSTRY IN TRANSITION FROM WAR TO PEACE
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Milwaukee, October 3-4, 1946

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Adams, H. R.
Aherns, Richard
Arnold, H. R.
Ashley, F. B.
Atchison, J.

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Young, G. H.
Youngchild, C. E.

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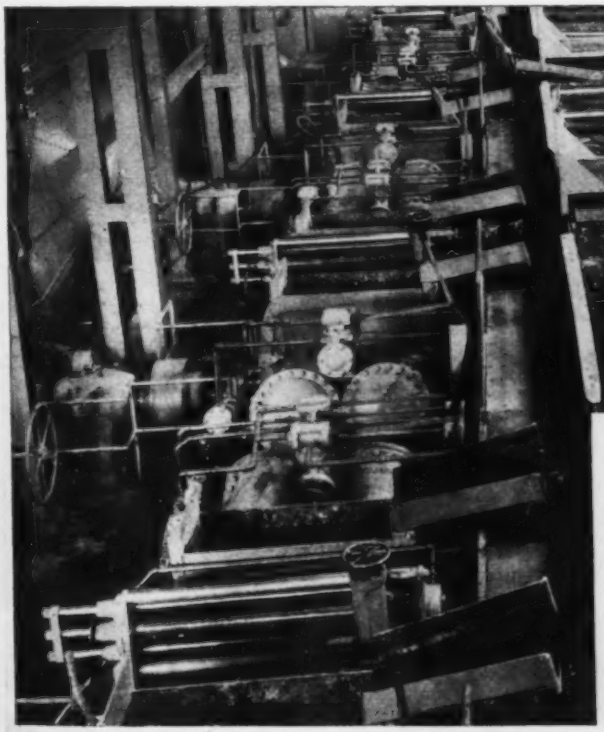

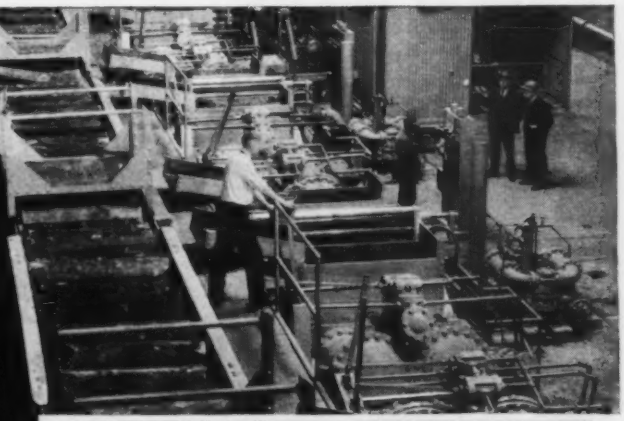

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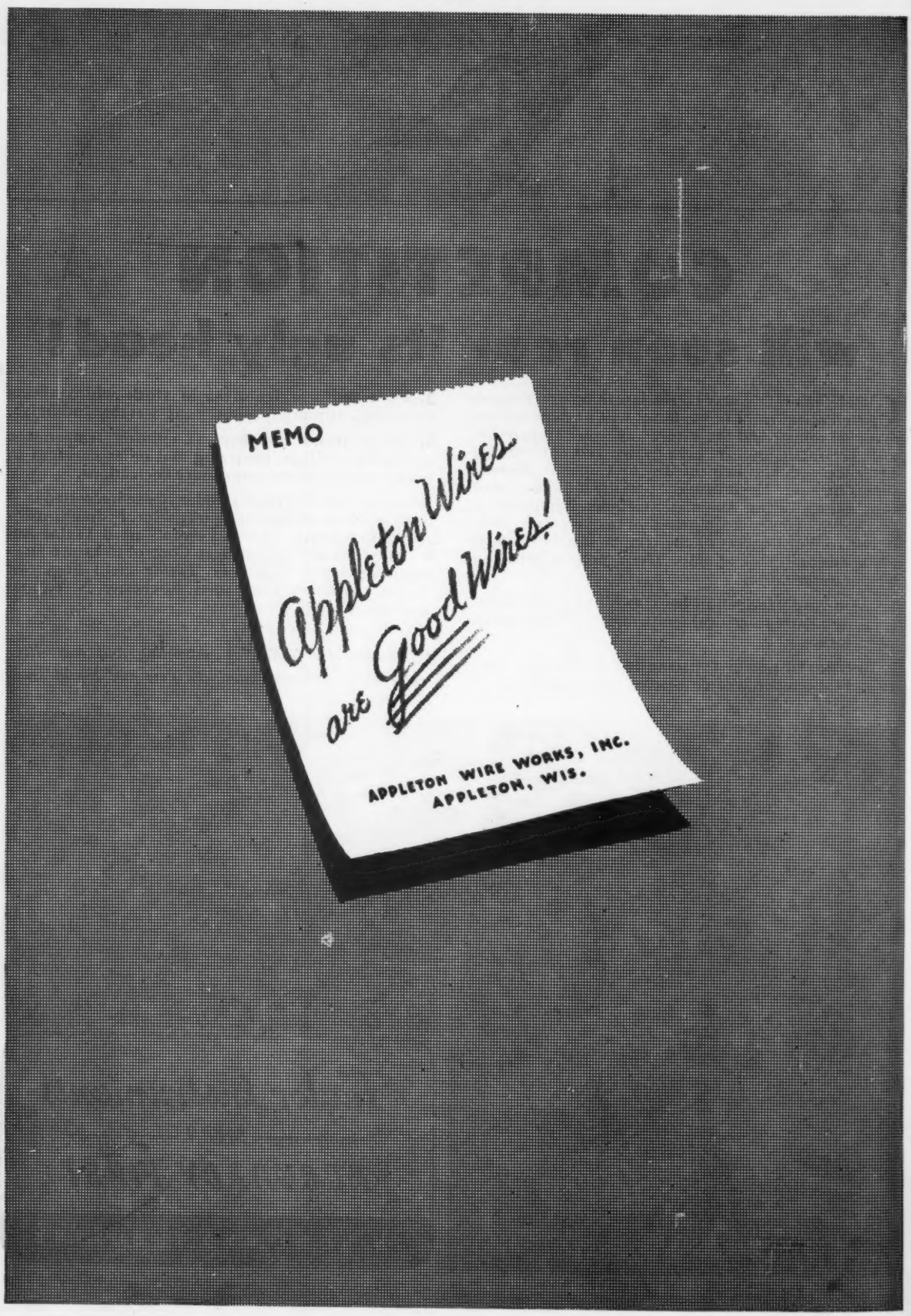
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Detroit Meeting Considers Pulpwood Demand and Supply

(Continued from page 65)

duction by any means that they can discover, to that same extent will the industry be able to meet adequately the potential pulpwood requirements in profitable operations without becoming alarmingly dependent upon any foreign country. The methods used among others include: better forest cost accounting which will help point up the unproductive and inefficient activities there; better means of transporting wood and of reducing the cost of handling wood; better methods of financing the cultivation of forests on an intensive enough scale to meet the needs of existing mills; making available wood of any kind even though the use of the particular species will require considerable and perhaps expensive research and development; further exploitation of new ideas for new items which will meet a consumer need and which will not compete on the world market but will help defray rising costs.

"It is also beginning to be realized that overall industry analysis is important to every company because only by constant scrutiny and intensive analysis of the industry as a whole can the trends be discovered which spell the future progress or doom of each mill."

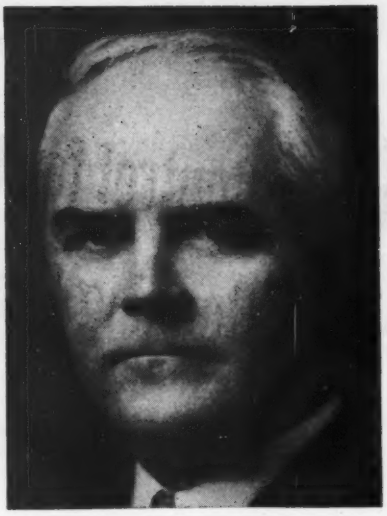
Survey of Available Woods

The Thursday afternoon meeting was held at the Rackham Memorial Building of the University of Michigan. S. T. Dana, Dean of the University of Michigan, School of Forestry and Conservation, presided at a symposium on "A Survey of Available Wood Stands in the United States."

Participating in this session were V. L. Harper, Director of the Northeastern Forest Experiment Station who discussed the situation in New England and the Eastern United States; E. L. Demmon, Director of the Lake States Forest Experimental Station; James W. Cruikshank of the Southeastern Forest Experiment Station who commented on the South; and H. J. Andrews, Regional Forester, Region 6, who talked on the Pacific Coast status. A summary of all of the regions including Canada was given by H. R. Josephson, Asst. Chief, Division of Forest Economics, U. S. Forest Service.

All of these speakers presented excellent details concerning their regions. In brief the speakers commented as follows:

E. L. Demmon: "The Lake States region has been an important factor in the national production of pulp and paper for more than half a century. At present, the industry is not self-sufficient in local sources of raw material. In recent years one-fourth of the pulpwood consumed, mostly spruce and balsam, have come from Canada. The Lake States have 50 million acres of commercial forest land but the amount of understocked and denuded areas indicates clearly that the forest potentialities of the region are far from being realized. In addition about one-fifth of all timber of merchantable size is of such poor quality, small size, scattered occurrence, or remove location that it cannot be profitably harvested and utilized under current market conditions. The allowable drain on pulpwood species is only one million cords of spruce, balsam fir, jack pine and hemlock (plus ½ million cords in saw timber sized trees), and 2 million cords of aspen (plus one million cords in saw timber sized trees annually.



REUBEN B. ROBERTSON
Urges Better Forestry Practice

"Total drain on pulpwood timber is one-fourth less than the allowable drain per year because of a large volume of unutilized aspen. However, the drain in spruce, fir and pine is 60 per cent greater than can be sustained on a permanent basis. Regional consumption of spruce must inevitably go down because the supply has declined greatly in recent years.

"A major problem is to improve cutting methods so that cutover lands will be left in condition to yield continuous crops. It is necessary to increase the use of aspen and other little used species, and also to restore the 14 million acres of denuded and poorly stocked land into a valuable forest."

James W. Cruikshank: "One half of the total U. S. pulp mill capacity is located in the South. These southern mills have an annual wood requirement of more than 8 million cords, and the demand increases as present plants expand and new plants come into production. This region has 183 million acres of forest land, including 35 million acres of longleaf-slash pine forest and 70 million acres of loblolly-shortleaf-hardwood forest of special pulpwood source interest. The total volume is 1.9 billion cords, with slightly more than half in hardwoods. Compared to an annual pulpwood requirement of about 8 million cords all this is very reassuring. However, pulpwood accounts for only 10 per cent of the total cut, and pulpwood producers must compete with other wood-using industries. At present, hardwoods supply less than 10 per cent of the pulpwood. An annual loss of 13 million cords—60 per cent more than the entire pulpwood cut—is caused by fire, insects and disease.

"The location of new mills in the same localities increases competition for pulpwood within the industry. The increased demand for lumber and the subsequent smaller sized trees cut for it magnifies wood procurement difficulties.

"The problem should be attacked by (1) research on use of hardwoods and fuller utilization of waste, (2) forest land acquisition, and (3) increased production of quality wood on nearby lands."

H. J. Andrews: "A determination of the amount of forest material available to the pulp and paper industry on the West Coast cannot be made with any degree of precision since there is competition with other wood-using industries for some of it. However, volume estimates of pulp species covering various segments of the country constitute a valuable reference base. The forest survey of western Oregon and western Washington showed slightly more than one billion cords of conifer pulp species in trees over 4 inches d.b.h., including three-fourths Douglas fir and one-fifth hemlock. The current annual drain is 3⅓ million cords but there is competition among mills in addition to that with other wood-using industries. As a class, pulp mills appear to be in a much stronger position than the average of all wood-using plants in respect to private timber owned or controlled.

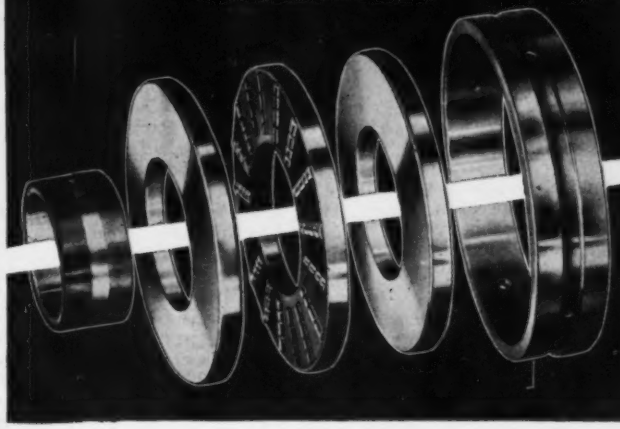
"The speaker believes that the future depends upon what the pulp industry does about the following propositions:

1. Competition with lumber and veneer mills for logs of large size and high quality. Continued dependence on this source will entail higher prices and short supply.
2. Use of smaller, lower quality material will make available large amounts not used by others. Sawmill waste will add to this supply.
3. A shift to kraft pulping would make wider utilization of species possible.
4. More intensive forest practices.

"In California there is very heavy competition for available stumpage. In Alaska, 80 per cent of the timber volume is primarily valuable for pulpwood. The pulpwood available in Alaska on a sustained yield basis will produce one million tons of newsprint annually."

H. R. Josephson: "The timber resources are steadily declining in both quantity and quality. The 461 million acres of commercial timber lands contain 470 billion cu. ft. or the equivalent of about 5¼ billion cords; 51% is in the West, 28% in the South and 21% in the North. Since the West has less

Extra hours of HEAVY DUTY WORK



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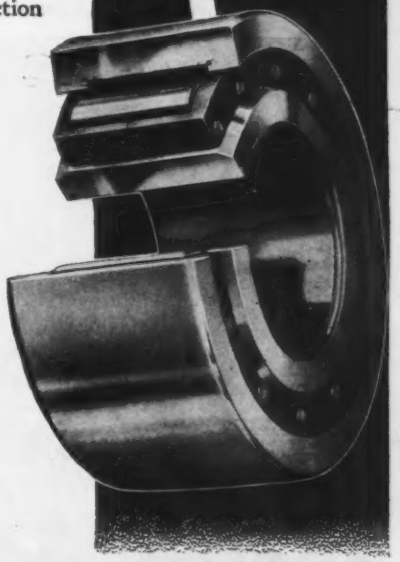

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than a quarter of the area, we may expect that as Western virgin timber is cut out eastern forests will more and more become the primary source of new timber growth.

"The forest capital which produces usable saw timber growth is still shrinking rather rapidly. In terms of all sizes, however, the situation with respect to growth and drain is considerably brighter, drain exceeding growth by only 2%. Cut of pulpwood in 1944 was 10% of total drain, 15.7 million cords, of which 89% was softwoods. Although growth and drain were thus almost in balance, it should be remembered that much of the drain is represented by large timber of high quality and good species, whereas most growth occurs on smaller sizes of poorer quality timber.

"The continued deterioration in the nation's forest growing stocks, coupled with high levels of potential requirements for lumber and many other forest commodities, indicates that the pulp and paper industry will be faced with increasing competition and higher prices for its wood supply. Also, most of the country's timber will remain unavailable to your industry because of such factors as location, species or ownership by competing users.

"In view of worldwide shortages of adequate and easily accessible timber, not to mention the extremely important factor of military security, it is evident that we shall have to depend primarily upon our own forest industries and timber resources. By greater use of available species, trees and wood waste the pulpwood resource base could be materially increased.

"Recent studies indicate that about ⅓ of the cutting on pulp company lands may be rated good or better, compared with only 8% for all private lands. But there is much room for improvement. Nearly 15 million acres of commercial forests are now owned by the industry. In good timber growing areas, more intensive management for integrated timber production is likely to be the best means of insuring adequate and low-cost local pulpwood supplies while at the same time realizing full returns from forest investments. Small holdings of less than 5,000 acres, averaging only 62 acres per holding, represent the crux of the problem, since these account for ¾ of all private forest lands. Where self-interest or education and public aids are not effective, some public control of cutting practices or public acquisition will be needed to insure that forests are kept productive."

Dinner Program

G. W. E. Nicholson, president, presided as toastmaster and gave an entertaining outline covering his recent visit to the Scandinavian countries in which he visited many industrial plants and research laboratories.

The speaker of the evening was Reuben B. Robertson, Sr., president of the Champion Paper & Fibre Company, and of the American Paper and Pulp Association. Mr. Robertson's address was entitled "Thrifty vs. Drift in Forest Practice." In this talk he pointed out among other things that much of the potential supply of forest products is lost through nonproductive processing of decay. We lose in productive capacity, if we cut excessively in an immature forest. Our losses are correspondingly great if we defer cutting in a mature forest too long and permit annual decay to exceed annual growth.

"Stumpage that is noncompetitive with any established demand should be considered as a potential raw material supply even though the cost of getting it cut is higher than the operator is normally accustomed to. Now stumpage can, at least in some degree, compensate for higher labor cost."

Friday Sessions

The morning session on Friday, September 27th, was held at the Rackham Memorial Building. K. S. Trowbridge, logging engineer of the American Pulpwood Association, presided as chairman. The session was devoted to New Developments Relating to Improved Pulpwood Procurement. This subject was treated on a regional basis. J. W. McNutt, of the Kimberly-Clark Corporation, represented the Lake States and the Eastern United States; Axel Brandstrom, formerly Chief Forester of the Crown Zellerbach Corporation, considered the Pacific Coast; C. E. Knapp, logging engineer of the Southern Pulpwood Association, represented the South.

The papers by these authors will be published as they cover so much material that they are difficult to condense into a few paragraphs. In speaking of the South, Mr. Knapp briefly summarized his talk as follows:

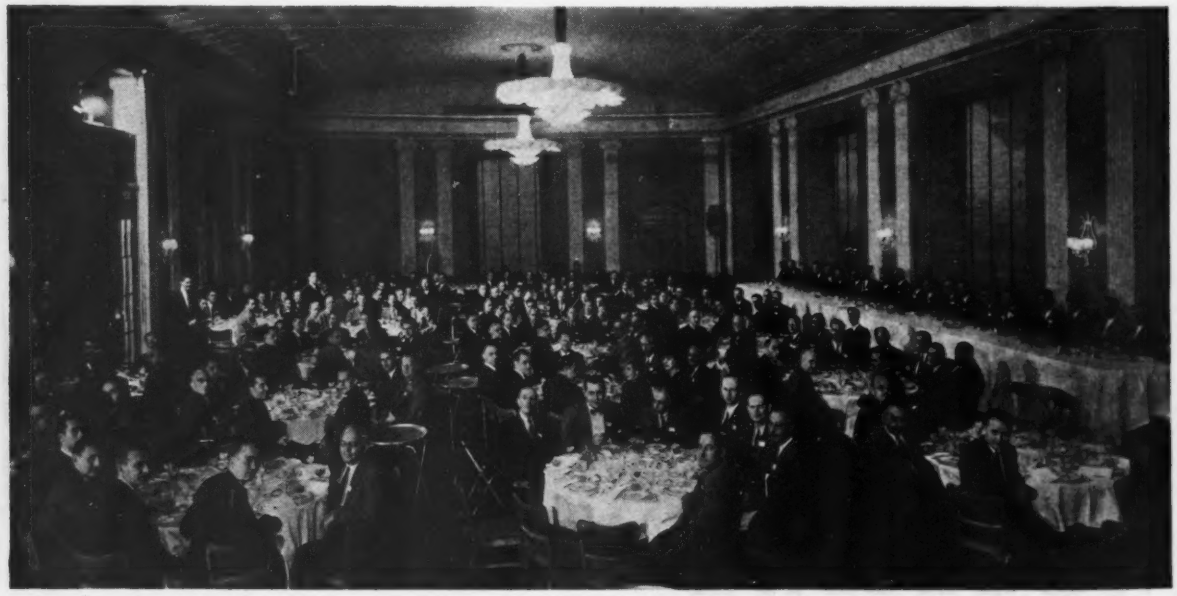
"The South produced last year roughly 7 million cords of pulpwood—approximately 50% of the production of the United States. It has 50 consuming mills. Several are expanding capacities, and eight additional new mills are announced for completion within two or three years.

Three general systems of wood procurement are used:

(1) Dealer—producer
(2) Mill representative—producer.
(3) Company logging operations.

Regardless of the system used, members of the Southern Pulpwood Conservation Association supply qualified forestry marking service on noncompany lands.

Mechanization is new—in the development stage. Most pine pulpwood is cut into 5-foot bolts at the stump and



Pause in a busy Detroit convention program—TAPPI dines at the Statler

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loaded directly on the truck by hand. Use of tractors and arches is increasing to yard tree lengths to central points for mechanical bucking and loading. Portable cut-off and conveyor loading mills are being introduced to increase production and reduce manual labor. Loading is the bottleneck and key to mechanized operation. Bundle loading using portable cranes is under examination for woods operations.

Portable power saws present our most widespread mechanical development in wood production. Between 5,000 and 6,000 wheel type circular saws operate in the southern flatwoods where they are readily adaptable. Portable chain saws with nonpinching blades show much promise.

Transportation of pulpwood to the mill is by truck, rail, and barge. Military three-axle trucks are widely used. Semi-trailer equipment is being improved to permit longer direct-to-mill hauling.

Current procurement problems involve shortages of railroad cars, trucks, logging machinery, and trained labor.

Manufacturers and industry are cooperating to devise improved pulpwood logging tools. Increased demands on wood production coupled with increasing wages and labor shortages indicate rapid development in mechanical pulping logging."

Following the luncheon, Milton O. Schur of the Ecusta Paper Company presided at a symposium on Pulping Characteristics of the Available Species.

J. N. McGovern of the Forests Products Laboratory dealt with Lake States and Northeastern woods and pointed out the advantages of using semi-chemical processes to utilize such woods as aspen and oak.

Walter Holzer of the Crown Zellerbach Corporation and R. S. Hatch of the Weyerhaeuser Timber Company discussed Pacific Coast woods and pointed out the developments in progress toward the pulping of Douglas fir and the use of magnesium bisulphite process. The utilization of sawmill waste was given extensive consideration.

Loren V. Forman and Donald D. Niemeyer of the Institute of Paper Chemistry discussed Kraft Pulping of Southern Hardwoods. This paper reported on an exploratory investigation of the kraft pulping characteristics of 59 southern pulpwood species. Coastal chinquapin appears to be the best species for use as a dual purpose wood, that is to produce pulp and tanning materials. The yield is moderately good and the product can be used in paperboard.

Saturday Program

Saturday morning was devoted to committee meetings. Most of the committees present combined to discuss the possibilities of the new committee on statistical analysis of which T. A. Pascoe is chairman. This committee will eventually be of great service to the many other committees of the Association that are interested in investigations in which extensive test data will be developed.

In the afternoon a large number of members remained to see the baseball game between the Detroit Tigers and the Cleveland Indians.

Although the attendance at this meeting was not large, it was attended by a group that was vitally interested in the type of program presented and indicated that such programs giving exhaustive treatment to a limited subject was of great value.

Among Those Present at the Detroit Meeting

A

Adrian, Alan, Neenah Paper Company
Ahrens, Richard
Aiken, W. H., Goodyear Tire & Rubber Co.
Alexander, T. W., Champion Paper & Fibre Co.
Amidon, George B., Minnesota and Ontario Paper Co.
Andrews, H. J., Forest Service
Aid, Joseph J., Robert Gair Co., Inc.
Allen, Charles G., Detroit Sulphite Pulp & Paper Co.
Anderson, Velden M., Fir Tex
Anderson, Victor C., H. P. Smith Paper Co.
Aronovsky, Samuel K., Northern Regional Research Lab.
Arthur, J. R., Port Huron Sulphite & Paper Co.
Atchison, Dr. Joseph E., John Strange Paper Co.
Auchter, M. J., Hoberg Paper Mills, Inc.

B

Backus, C. J., Collins Mfg. Co.
Baker, D., Container Corp. of America
Beall, Geoffrey, Institute of Paper Chemistry
Bingham, Richard T., TAPPI
Birchard, W. H., Fraser Paper, Ltd.
Boggess, W., Doyle, Beveridge Paper Co.
Borowsky, Harry, Onyx Oil & Chemical Co.
Boyce, M. H., E. I. du Pont de Nemours, Inc.
Brabender, George J., Marathon Corp.
Brawn, Worthen E., Pejepscot Paper Co.
Brennan, E. M., Railway Supply & Mfg. Co.
Babler, Berle B., Ohio Boxboard Co.
Batchelder, George W., F. G. Findley Co.
Bachelder, C. L., Hercules Powder Co.
Bainbridge, John P., Jr., Monsanto Chemical Co.
Barnes, Ellis O., Union Bag and Paper Corp.
Barr, James C., Manhattan Rubber Div. of Raybestos-Manhattan
Barnhart, P. S., Westfield River Paper Co.
Beazley, William E., Moore Business Forms
Bennett, Murray H., Stebbins Eng. & Mfg. Co.
Benny, J. C., Gaspesia Sulphite Co.
Bingham, Clevis F., Virginia Smelting Co.
Bolles, Arthur F., The Dicalite Co.
Bradner, Donald B., Du Pont Co.
Brandstrom, Axel J. F., West Fork Timber Co.
Brownell, James, Kellogg Co.
Buff, Karl E., National Automotive Fibres
Burchfield, Paul E., Wyandotte Chemical Corp.

C

Calkin, John B., Union Bag & Paper Corp.
Callighan, Olin W., Edgar Bros. Co.
Camp, Eric W., National Aniline Division
Carson, R. G., Solvay Sales Corp.
Claridge, B. E., Hammermill Paper Co.
Cochrane, R. C., E. I. duPont
Compton, J. H., Jr., Georgia Kaolin Co.
Conklin, A. E., C. A. Reed Co.
Conner, Arthur C., Filer Fibre Co.
Connor, C. M., Glassine Paper Co.
Cooper, Walter W., Dow Chemical Co.
Cornell, John, Paper Mills News
Cottrell, S. V., National Aniline Div.
Criss, J. W., Du Pont Co.
Cameron, D. D., Hercules Powder Co.
Campbell, R. A., Blandin Paper Co.
Chamberlain, L. B., Container Corp. of America
Champion, C. H., R. T. Vanderbilt Co.
Chandler, John B., Bristol Co.
Chidester, G. H., Forest Products Laboratory
Clark, James d'A.
Coffin, Arthur A., Titanium Pigment Co.
Cooper, A. M., Westinghouse Electric & Mfg. Co.
Corey, A. J., Fraser Paper Ltd.
Crandall, H. C., Mosinee Paper Mills
Cruickshank, James W., Southeastern Forest Experimental Station

D

Davidson, J. H., Minn. & Ont. Paper Co.
Davis, L. E., Casein Co., of America
Dean, J. A., Michigan Paper Co.
Denham, Fred H., R. T. Vanderbilt Co.
Dever, W. C., Virginia Smelting Co.
Dickson, J. D., Jr., R. T. Vanderbilt Co.
Dunbar, T. L., Chemipulp Process, Inc.
Davis, R. L., Detroit Sulphite Pulp & Paper Co.
Demmon, E. L., Lake States Experiment Station
Diehm, R. A., R. R. Donnelly Co.
Doughty, Randall H., Fitchburg Paper Co.
Durant, L. G., Paper & Industrial Appliances, Inc.

E

Ekholm, Ivar, National Aniline Div., Allied Chemical & Die Corp.
Engel, Edward, General Chemica Co.
Erspamer, August S., P. H. Glatfelter Co.
Easton, Paul, Hercules Powder Co.
Elias, R. T., Whiting-Plover Paper Co.
Enderlein, Gust F., Mosinee Paper Mills
Estabrook, R. A., Maine Seaboard Paper Co.

F

Faulkender, C. R., Hoberg Paper Mills
Feorello, Frank Vincent, Barrett Div., Allied Chemical & Dye Corp.
Fisher, G. N., Kraft Foods Co.
Forman, L. V., Institute of Paper Chemistry
Franklin, G. A., E. B. Eddy Co.
Fyfe, Thomas, Eastman Kodak Co.
Foster, Sam L., K. V. P. Co.
Fries, K. W., Rhinelander Paper Co.
Fritz, James H., National Oil Products Co.

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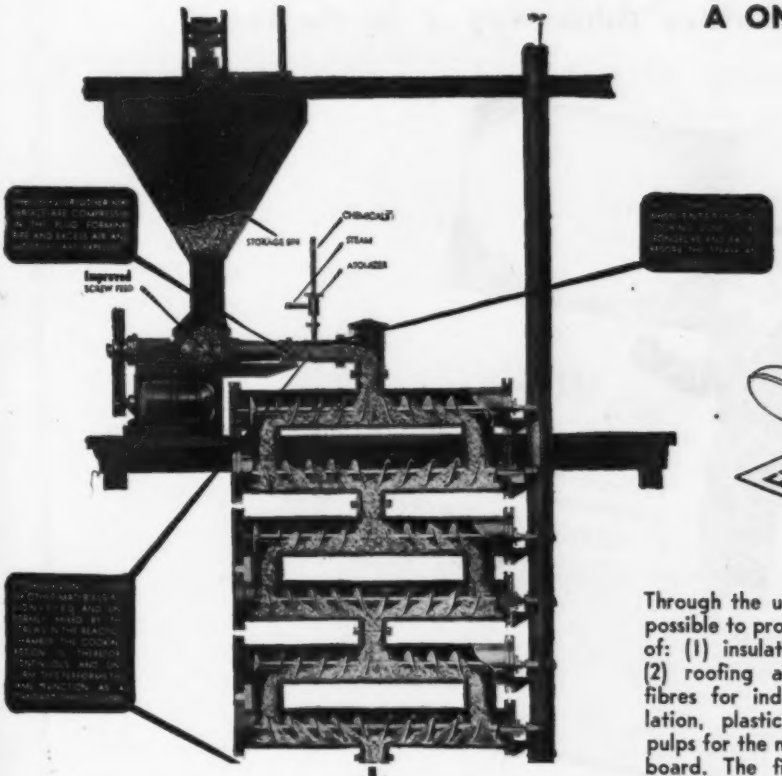

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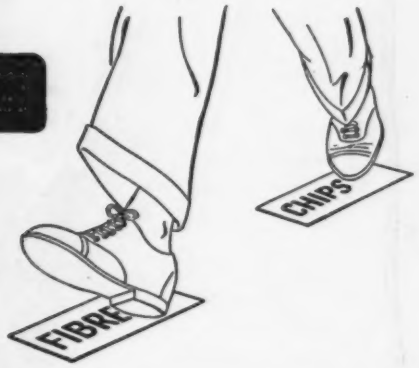

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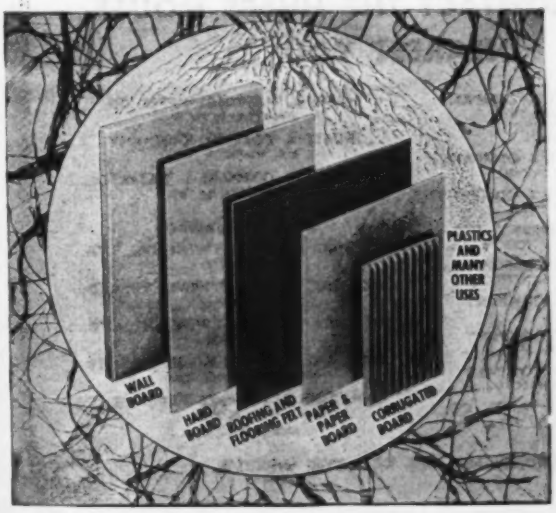

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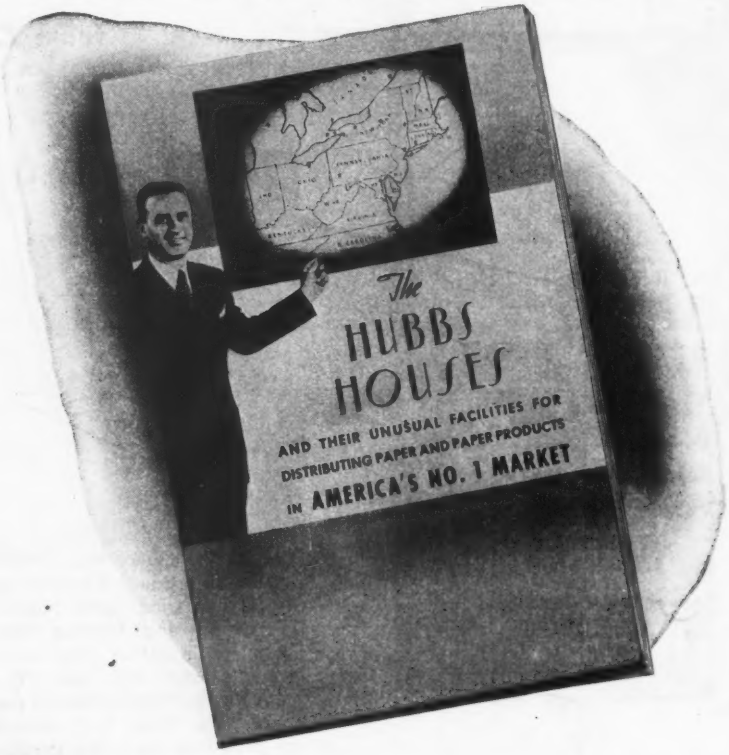

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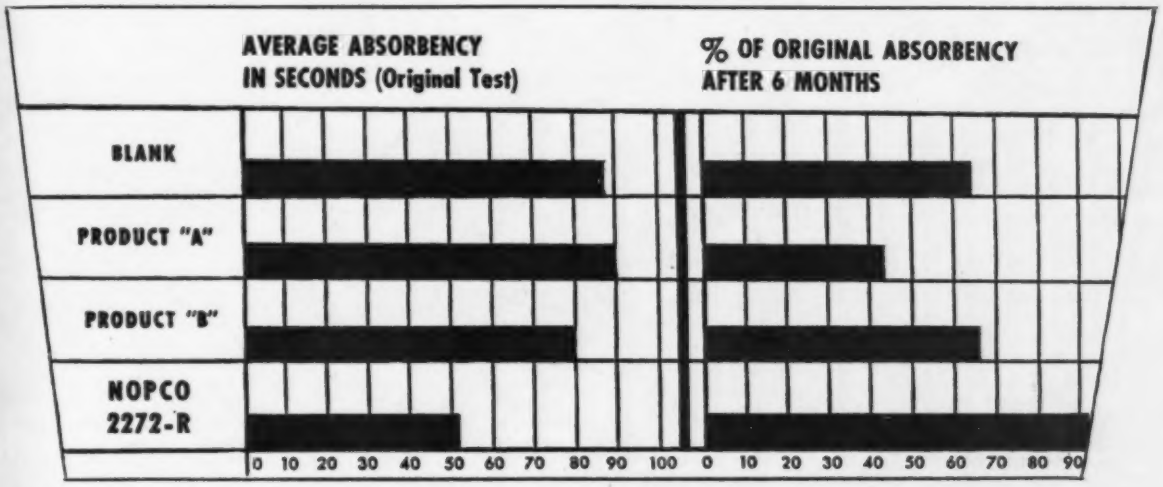
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% OF ORIGINAL ABSORBENCY AFTER 6 MONTHS
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0 10 20 30 40 50 60 70 80 90

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Some sheets from each group were tested immediately for absorbency. Other sheets were tested at regular intervals for six months. Absorbency was measured by recording the time for 1 drop of distilled water to be absorbed completely into the sheet. Greater accuracy was assured, because these tests were the result of *natural* rather than *artificial* aging.

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Gillespie, W. F., Gaylord Container Co.
Gooding, P. P., Strathmore Paper Co.
Gralow, B. B., Ontario Paper Co.
Grunwald, Fritz B., Consolidated Paper Co.

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Hannaway, Harold, Monsanto Chemical Co.
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Heil, Frederick P., Lockport Felt Co.
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Han, S. T., Chinese Ministry of Economic Affairs
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Isenberg, Irving H., Institute of Paper Chemistry

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Jensen, Harry R., Northwest Paper Co.
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Jones, Nard, Pulp and Paper Industry

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Knapp, G. E., Southern Pulpwood Conservation Assoc.
Kulvik, Gunnar, Enso Gutzeit O/Y
Kumler, Ralph, American Cyanamid & Chemical Corp.
Koller, Arthur F., Filer Fibre Co.
Kuhlman, Myron G., Ohio Boxboard Co.

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Lockwood George E., Paper Trade Journal
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Lum, Edward, Beckett Paper Co.
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Lyon, James R., F. G. Findley Co.
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Libby, Frank D., Kal. Veg. Parchment Co.
Long, F. D., Container Corporation of America
Loutrel, Louis F., Jr., Monsanto Chemical Co.
Lowe, James C., Oliver United Filters

M

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Mahon, Stephen, Stream Clear Corp.
Mahoney, James D., Monsanto Chemical Co.
Mason, J. Gilbert, Sr., Edgar Brothers Co.
McCall, F. S., Union Bag and Paper Corp.
McCarron, R. D., Stein, Hall & Co., Inc.
Miller, Paul C., Stein, Hall & Co., Inc.
Mills, J. C., Wyandotte Chemicals Corp.
Mills, Russell T., E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept.
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Maasberg, A. T., Dow Chemical Co.
Macdonald, R. G., TAPPI
Markle, G. M., E. I. du Pont de Nemours
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McArthur, D. W., Reichhold Chemicals, Inc.
McGovern, J. N., Forest Products Laboratory
McGrath, Louise, Booth Chemical Co.
McGregor, G. H., Minnesota & Ontario Paper Co.
McNutt, J. W. Kimberly-Clark Corp.
Morse, T. S., Hercules Powder Co.
Moss, L. A., Whiting-Plover Paper Co.

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Norton, S. G., Hercules Powder Co.
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Niles, George S., Monsanto Chemical Co.
Nylund, John J., General Dyestuff Corp.

O

O'Brien, Albert S., Eastman Kodak Co.
O'Neil, C. J., Johns Manville Sales Corp.

P

Parsons, S. R., Consolidated Water Power & Paper Co.
Pascoe, T. A., Nekoosa-Edwards Paper Co.
Phelps, Maurice W., Solvay Sales Co.
Pigman, Ward, Institute of Paper Chemistry
Parsons, John L., Hollingsworth & Whitney Co.
Peter, Robert H., du Pont
Pitkin, Ward H., Oliver United Filters, Inc.

R

Reichert, J. S., Du Pont-Electrochemicals Dept.
Reno, W. H., Cincinnati Rubber Mfg. Co.
Robinson, C. P., Heppenstall Co.
Robison, John E., Fir-Tex Insulating Board Co.
Roderick, Howard F., Wyandotte Chemical Co.
Rawling F. G., West Virginia Pulp & Paper Co.
Reeves, Henry, Jr., Hercules Powder Co.
Renner, M. S., Dewey & Almy Chemical Co.
Richardson, C. A., Blandin Paper Co.
Robertson, Reuben B., Sr., Champion Paper & Fibre Co.

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Sankey, Chas. A., Ontario Paper Co.
Schafer, E. R., Forest Products Laboratory
Schaffert, R. M., Battelle Memorial Institute
Schur, Milton O., Ecusta Paper Co.
Shallcross, Ruth, Institute of Paper Chemistry
Shaw, A. C., Champion Paper & Fibre Co.
Sigvart, Charles M., Marinette Paper Co.
Snowman, P. A., Casein Co. of America
Snyder, J. H., Maine Seaboard Paper Co.
Sommerville, F. G., Armstrong Cork Co.
Spencer, George H., Torrington Company
Stahl, B. Franklin, Terre Haute Paper Co.
Swope, G. L., Owens-Illinois Glass Co.
Savage, R. H., Mead Corp.
Schreiber, Paul R., General Dyestuff Corp.
Schroeder, F. C., Northwest Paper Co.
Shaughnessy, J. Brooke, American Wringer Co.
Siple, R. H., Corn Products Sales Co.
Sheeran, Stanley R., Du Pont
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PULP AND PAPER

New Developments To Combat Corrosion In Paper and Pulp Industries*

By K. P. Chamberlain[1]

Abstract

Liquid Neoprene, Nitrocote, and Durofilm, three products which are having wide use in the paper and pulp industries in handling corrosive problems are discussed.

A rubber pipe joint which eliminates the present flanged fabricated pipe and fittings have been developed. This new method eliminates the high cost of design and engineering and completely revolutionizes the rubber-lined pipe industry.

Coating Materials

One of the most interesting developments in the past five years has been the rapid increase in the use of liquid Neoprene which is a material that handles almost all acids, alkalies, and many solvents at temperatures ranging from —58° to 250°F. Its adhesion qualities to steel are exceptional. In fact, it adheres at 1100 p.s.i. with a tensile strength of 1500 p.s.i. As a liquid, it can be painted, flowed, rolled, or dipped to all irregular shapes and surfaces, leaving a perfectly smooth lining or coating. Because of its ability to take temperatures up to 250°F., it handles many of the corrosive conditions far beyond that of natural rubber. Developments have taken place in the past two years whereby this same material is now calendered into sheet form, uncured, in thicknesses of $\frac{1}{16}$, $\frac{1}{8}$, and $\frac{3}{16}$ inch and can be applied to all heavy work faster and more economically than the liquid method. However, the liquid method still holds the field in the irregular shapes.

One of the most striking examples of Neoprene applications is on rectifier rolls or, distributor rolls, a war-time substitute which turned out to be better than the original equipment. During the war it became very difficult to obtain brass and bronze rectifier rolls. Paper machine manufacturers then adopted steel rolls covered with Neoprene. Construction was less expensive and, naturally, the change was viewed with doubt by the operating men. However, the performance of the Neoprene covered rolls was so good that they have won wide acceptance and today they are replacing brass and bronze rolls in the paper industries throughout the country. In this particular case, because of the fact that the rolls are all sizes covered with 1-inch holes, and the job was to line inside and outside up and over the ends to the bearing point, the rolls were revolved slowly in a Neoprene bath so that the compound covered both the interior and the exterior. They were constantly rotated until the final thickness was on, then the rotation was kept up during the cure. They came out perfectly smooth, lined uniformly inside and out, over the end and up to the bearing. Adhesion, again, was 1100 p.s.i. and in addition to this, they had a slick smooth surface which did not catch the fibers in the hole areas.

Another advantage of these covered rectifier rolls was of prime importance to the designers. Heavy walled brass or bronze was required to prevent sagging but since steel is much stiffer, lighter gage metal can be used in the roll construction.

One of the outstanding advantages of Neoprene linings is the ease of curing. Actually, it is cured with ordinary warm air at 210°F. thereby eliminating pressure cures. This means that work today of this nature can be done either at the rubber plant or at the paper and pulp mill.

A great deal of work that is being done successfully for the paper and pulp industries today includes rectifier rolls, stock pumps, suction box covers, fan housings and fans, troughs, white water tanks, flow boxes and baffles, doctor backs, pipe and fittings, centrap covers, aprons, sizing tanks, table rolls, head boxes, bars and girths, pulp measuring devices, and many other items.

A second interesting development which has been carried on very successfully in the past few years is a material called Nitrocote which was particularly developed to handle nitric acid, bleaches, and solvents. It was designed to be used where strong oxidizing solutions decompose natural rubber or Neoprene and where severe temperature and abrasion prohibits the use of the more common resins. This material is a hard but flexible lining eliminating surface chipping and has an adhesion to steel of over 1000 p.s.i. with a temperature of 200°F. It has had wide use in the handling of hypochlorites and other various bleaching solutions. It has the ability to withstand hard blows without any injury to the lining whatsoever and is adaptable in the lining of pipe and fittings.

The third very interesting development has been a material known as Durofilm. It is an easily applied air-drying protective coating. It is not a paint, but a solution of carefully selected and blended plastics designed to give maximum protection at minimum cost. One of its outstanding advantages is that as fast as it is applied, it dries immediately. It has adhesion qualities again equal to 1000 p.s.i. on steel. It is flexible; it can be applied either at a rubber plant or in the field by the paper mill employees themselves.

It was developed approximately two years ago and it was first tried out in a paper company on the Eastern seaboard to the exterior of the structural work of a fourdrinier. In this particular paper company, they had been experiencing considerable difficulty in scale falling on the wire caused by solvent mixed with the water. As the scale formed it shortened the life of the wire to 10 days, which caused shutdown, loss of production, plus the cost of the new wire and installation of the same. The lining job was accomplished in a few days and it solved the problem, First, the life of the wire was lengthened to three times its previous period, more than paying

* Presented at the meeting of the Technical Association of the Pulp and Paper Industry held at the Pfister Hotel, Milwaukee, Wis., Oct. 2-4, 1946.

[1] Vice President and General Sales Mgr., Gates Engineering Co., Wilmington, Del.

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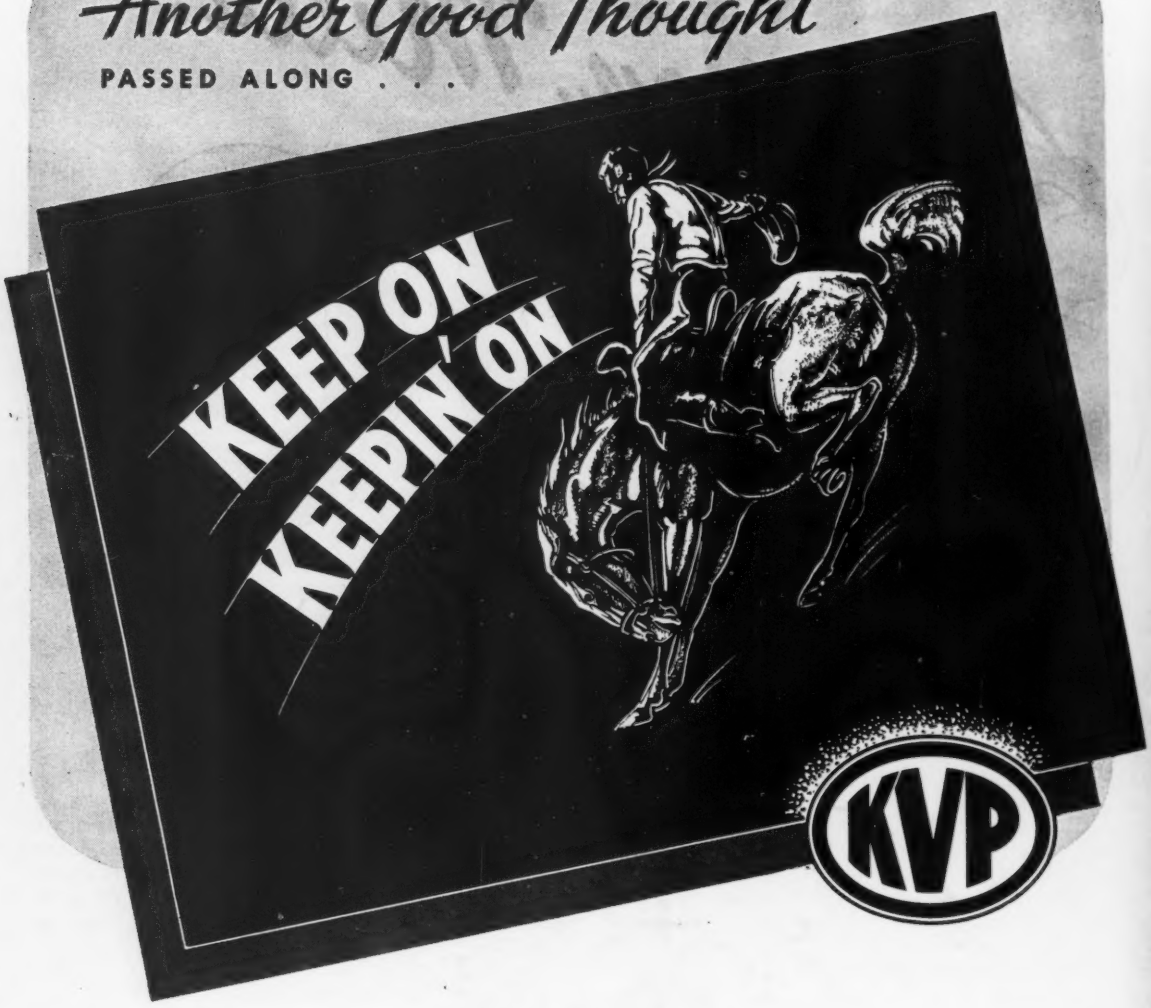

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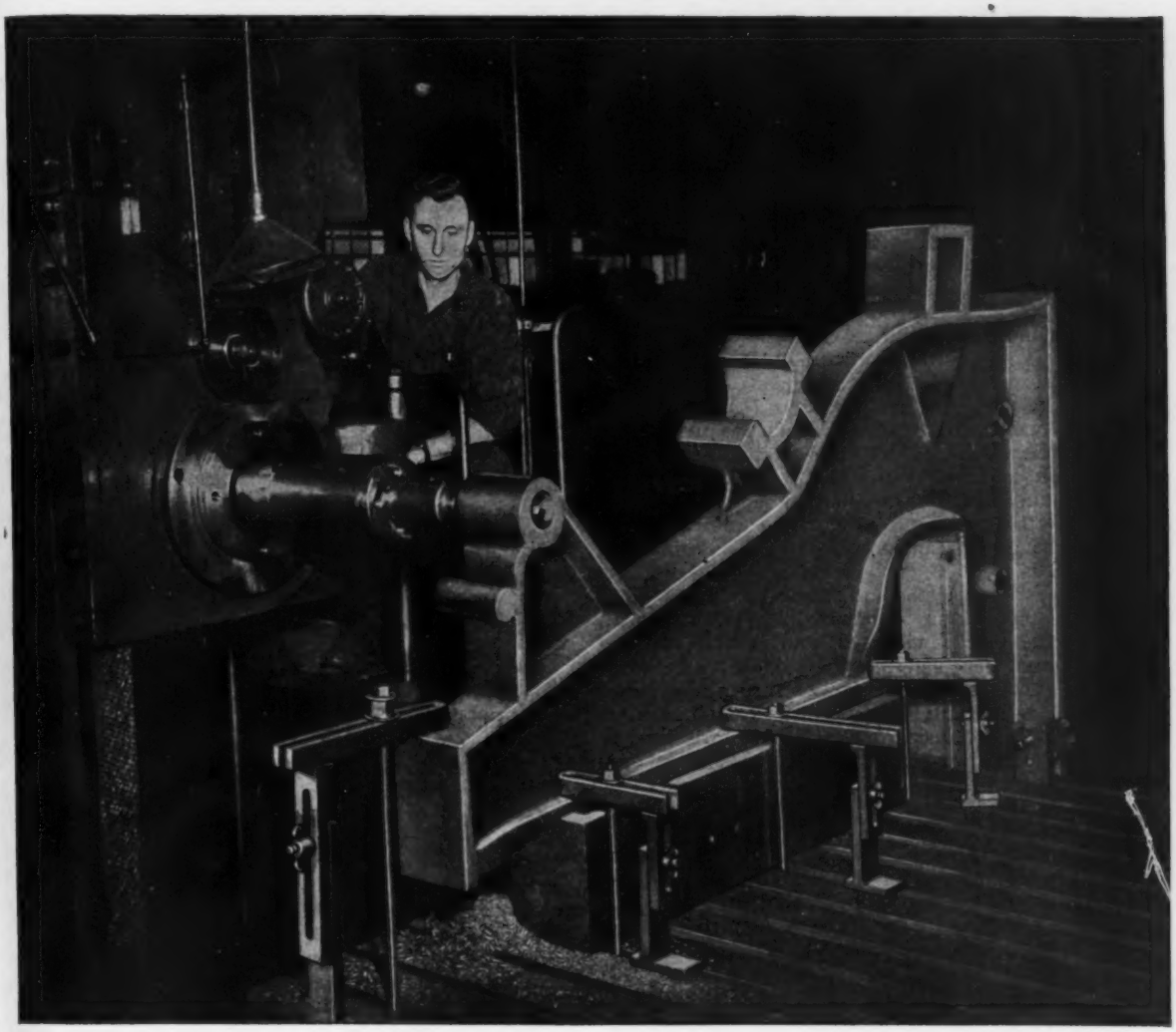

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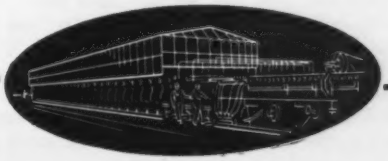

for itself many times over. Since that time, this material has been used on several similar type jobs for the same company. Now the material is being used in the lining of concrete beaters and stock chests and has had unusual success in several paper companies. It can be applied in pure white, light grey, black, and also several other colors. It handles temperatures of 150°F., requires no curing, is easily applied by the rubber company or by the paper mill's maintenance men. It is being used today by several paper machine manufacturers with excellent success.

Rubber Lined Pipe Joints

A rubber-lined pipe joint has been developed that completely revolutionizes the rubber lined pipe industry.

Rubber-lined pipe is one of the most important products in tank-lining field and is closely allied with all phases of it. It is employed to transport chemicals and general industrial products where corrosive acids and contamination are factors.

This pipe is used in practically all plants where acid is stored in rubber-lined tanks or where it is used in the manufacturing process.

The potentialities of this product was never fully realized because of expense and the necessity for installations to be made-to-order. Consequently there is a definite industrial demand for pipe of the inner seal type that is more economical in fabrication and can be bought in random lengths and assembled in the field.

In the present method of fabricating rubber-lined pipe the pipe is cut to required length, flanges attached, the pipe sandblasted, and several coats of cement are applied at intervals. A deflated, unvulcanized rubber tube is then drawn through pipe after which it is inflated by air pressure and nursed in position to cover inside of pipe; great care must be taken to avoid trapping air back of rubber. The ends of the tube are stretched over flanges as far as they will go and added rubber is applied to completely cover face of flange.

The disadvantages of the present method are that it is expensive, because of high labor costs. There may be faulty construction due to blistering and to application not coming under direct visual and manual contact. Then to the compound is confined to few materials, as hard and soft rubber. The expense of laying out a job on the drafting board before making installation causes a reluctance of potential users to buy this pipe due to possible errors in measurements.

Suppose that a paper mill has a rubber lined pipe job to do. First, a corp of engineers is sent out into the plant to check up on every detail of the rubber-lined pipe distribution system, because every piece has to be carefully measured, every fitting has to be accounted for and designed to meet the conditions, and naturally, this means that every piece has to be fabricated with a welded flange. After this has been done, the engineers start to work on the design. Considerable time elapses between the start and finish of the engineering necessary to issue a completed blueprint to the pipe fabricators. Then the job is awarded to the pipe fabricator. It takes several weeks to fabricate the pipe and fittings, and then it has to be sent to the rubber-lining company to rubber line the pipe and fittings and finally is sent back to the paper mill for installation. This is a long costly procedure and the expense for engineering and design is beyond that of the cost of the pipe and the rubber lining.

Today, the same company has the same job to do. The mill superintendent or an engineer can merely take an average distance of the amount of pipe that they need and it doesn't make any difference whether they buy 20 or 50 feet more than what they actually require. Then, they count up the number of joints that are necessary to connect the pipe and fittings and finally, they count up the number of adapter joints that are necessary to connect into a paper stock pump or a flanged pipe on a tank. The paper company then picks up the telephone, calls the rubber plant and orders, for example, 400 feet of 4-inch pipe, thirty joints, an adaptor for a paper stock pump, and an adaptor for a flanged pipe on a tank. There is no more flanged pipe with which to bother. The pipe is shipped within a day or two after the order has been placed, in 20-foot lengths. The pipe can then be cut and assembled with this joint exactly as with a conventional heating or plumbing installation. The joint can be put together quickly without lost time. Fittings, as well as pipe can be assembled with this joint in short order without tremendous cost for design and engineering.

In the handling of acids or alkalies, seldom is any pressure required beyond 75 pounds, and the joint has been tested to 1000 pounds pressure. The joint consists of two ordinary flanges which are mounted on the pipe after it is cut. They are not rubber lined and merely are used to support the rubber joint that fits in between the two cut pieces of pipe. In order that the rubber insert that fits in between the joint is tight and snug, a machine has been developed which cuts a ridge $\frac{7}{16}$ inch in depth into the inside of the rubber-lined pipe which acts as a seal for the inner lock joint. Therefore, decided advantages of this new method over the old are as follows:

1. Elimination of design and engineering to a large extent.
2. Elimination of welded flange pipe and fittings.
3. Pipe can now be ordered and stored at a paper plant and is ready for use at any time during a breakdown or during maintenance work that occurs on the shut-down period each year.
4. Ease of assembly.
5. In cases where distribution systems change, the present rubber lined pipe taken down, cut, and reassembled will meet new requirements.

This new development will be in production within a matter of a very few months, therefore becoming available to the paper and pulp industry in the handling of chlorine, SO_2, stock lines, and all other rubber-lined pipe uses in a paper mill.

This is the first decided step in the right direction toward the one problem that has confronted the paper industry and that is to be able to cut rubber-lined pipe and put it together with no loss of rubber lining plus a saving of engineering and design. The development of proper lining materials to handle the various problems that confront the paper and pulp industry is becoming an extremely important field.

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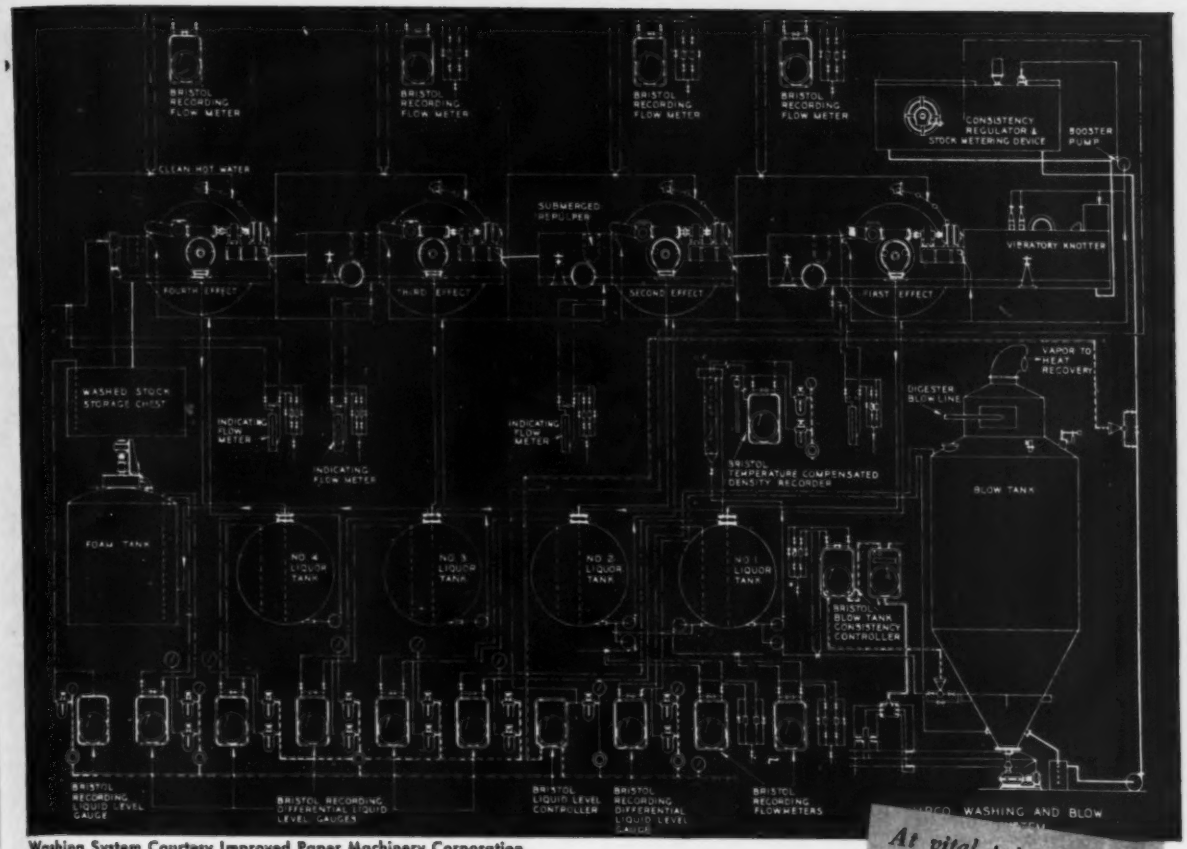

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Effect of Mildew on Caselining Material

By B. W. Scribner[1] and E. Abrams[2]

Abstract

Because of the extensive mildew damage to supplies for our armed forces in tropical regions during World War II, particularly plastics, textiles and leather, the war agencies of the Government requested the National Bureau of Standards to undertake extensive studies of the problem of mildew.

Although less trouble of this kind was reported for paper products, at the request of the War Production Board, an investigation of the mildewing of caselining materials under tropical conditions was made to find how well they might continue to serve their important function as a moisture barrier when exposed to such conditions.

Samples of sheetings used to line shipping cases, kraft papers used in their manufacture, kraft paper coated with asphalt fractions of different softening points, and the seams of liners sealed with various adhesives, were hung in a room maintained under tropical conditions. Specimens were removed at the end of three or four successive 4-week periods and examined for amount and species of fungi present and tested for deterioration.

The growth of mildew ranged from slight to heavy on the different specimens. While the data are not consistent, when they are considered as a whole, the extent of deterioration had a relation to the amount of mildew growth and the presence or absence of the fungi, Chaetomium globosum *and* Penicillium sp.

The caselining materials, the base papers, and kraft paper coated with asphalt all decreased in strength, stretch and water resistance but some were more resistant than others. Of eighteen unreinforced kraft laminated papers, the number showing no deterioration at the end of 4 weeks exposure was eight; at the end of 8 weeks, three; at the end of 12 weeks one; at the end of 16 weeks none. Papers reinforced with strands of sisal fibers or jute scrim cloth deteriorated much more rapidly than the other laminated papers and the growth of mildew was heavier on the lines of the reinforcing material than on the other part of the sheet. The maximum percentage decreases from the original tearing resistance, tensile strength, stretch, and water resistance of the asphalt laminated kraft papers were, respectively, 70, 80, 70, and 90. Sheetings with cotton wadding or cotton cloth as a component also deteriorated much more rapidly than the kraft laminated papers containing no reinforcing material.

The deterioration of the base papers in general was more rapid than that of the asphalt-laminated kraft papers containing no reinforcing material.

The rate of deterioration of the kraft papers coated with asphalt was rapid and the higher the melting point of the asphalt fraction the greater was the deterioration. In general, the mildew growth was heavier on the uncoated side than on the asphalted side of the sheets. In tests made with pure cultures of fungi, the growth of mildew was very heavy on the kraft paper and very light on the different asphalt fractions, and the amount of mildew growth increased with increase in the softening points of the asphalt fractions.

None of the adhesives showed significant failures after the exposures, either dry or after wetting the seams. The adhesives were composed of mixtures of asphalt, rubber, and synthetic resins.

[1] Member TAPPI; Chief of Paper Section, National Bureau of Standards, Washington, D. C.
[2] National Bureau of Standards, Washington, D. C.

TABLE I.—KIND OF FUNGI FOUND ON CASELINING MATERIALS AFTER DIFFERENT PERIODS OF EXPOSURE IN TROPICAL ROOM

Symbols: My — *White mycelium*; Ch — *Chaetomium globosum*; Psp — *Penicillium sp.*; An — *Aspergillus niger*; Ao — *Aspergillus oryzae*; Ac — *Actinomyces*

Sample Designation[1]	Present After 4 Weeks	Changes[2] After 8 Weeks	12 Weeks	16 Weeks
A	My	+Ch, +An	+Psp	—Ch
B	My, Psp, Ao, An	+Ac	none	+Ch
C	My, An, Psp, Ch	+Ao	+Ac	—Ac
D	My, An	+Psp, +Ch	+Ao, —Ch	none
E	My, Psp, Ch, An	—Ch	+Ch, +Ac	—Ac, +Ao
F	My, An, Ch	+Ao, +Psp, —An	—Ao, +An	none
G	My, Ch	+Ac	+Psp, +An, —Ac	none
H	My	+An, +Ch, +Ac	—Ch, —Ac	none
I	My, Ao, Psp, An	—An, +Ch	—Ao, —Ch	+Ch, +Ac, +An
K	My, Ao, Psp	+An, +Ch	—Ao, —Ch	+Ao
M	My, Psp, An	—Psp, —An, +Ch	+An, +Ac	—Ch, —Ac, +Psp
O	My, An	none	+Psp	—An, —Psp
P	My, An, Ao, Psp, Ch, Ac	none	none	none
Q	My, An, Ao, Psp, Ch, Ac	none	none	none
R	My, An, Ao, Psp, Ch, Ac	none	none	none
S	My, Ao, An, Psp	—An, —Psp, +Ch	—Ao	+Psp, +An
T	My, Psp, Ch, An	—Ch, —An	—Psp	no sample
U	My, Ch, Ao, An, Psp	none	none	—Ao, +Ac
V	My, Psp, Ao	—Ao, +Ch	—Ch	no sample
W	My, Psp, Ch, An, Ao, Ac	—Ac, —Ch, —An	+Ae	—Ac, —Ao
X	My, Ch, An, Ao, Psp	none	+Ac	none
Z	My, Ch, An, Ao, Psp	none	none	none
AA	My, An	no sample	+Ac	—An, —Ac
BB	My, An	—An	+An	none
CC	My, Ao, Psp, Ac	+Ch	+An, —Ch	—Ao, —Ac
DD	My, Psp	no sample	—Psp	+Psp, +Ao, +An
EE	My, Psp, Ao, An, Ch	none	none	—Ao, +Ac
FF	My	+Psp, +Ac, +An	none	+Ch
GG	My, An, Psp	+Ch	+Ao	—Ao
HH	My, Ac	+Psp	—Ac, —Psp	+Psp, +An
II	My, Ao, Psp, Ac	—Ao, —Ac, +Ch	—Ch	none

[1] For description of materials see Table II.

[2] Plus sign indicates presence and minus sign absence.

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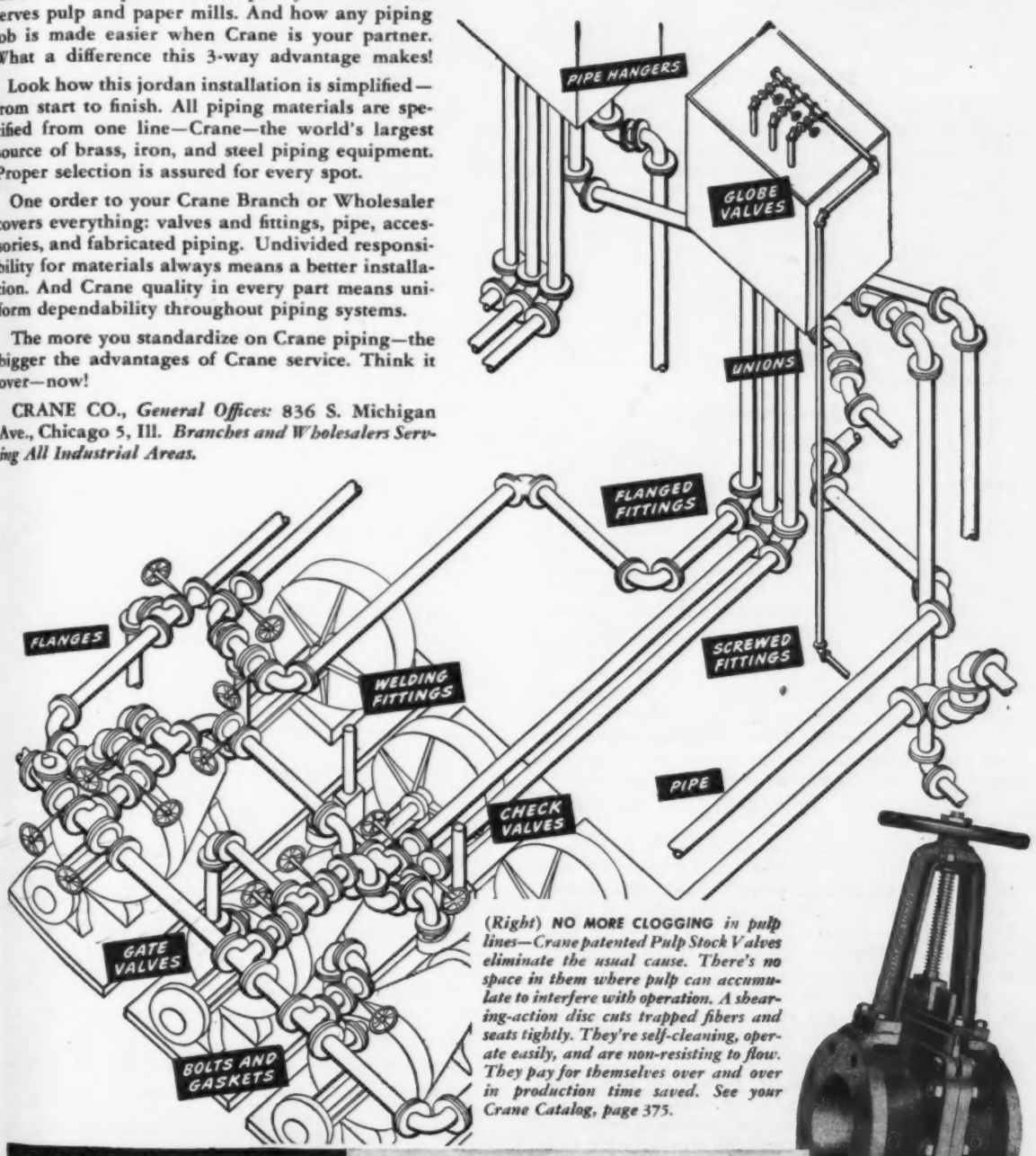

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This is a second report of the results of an investigation made at the request of the Container Coordinating Committee, War Production Board, and with the assistance of funds from the Board's Office of Production Research and Development. The investigation was made for development of standards for caselining materials, the results of which are given in the first report *(1)*, and to find how such materials and their components might behave in tropical regions, particularly with respect to mildewing. This report deals with the latter.

Materials Tested

Thirty-one caselining materials were tested. There were 24 asphalt-laminated kraft papers, made with plain paper, paper infused with asphalt, paper containing waxy materials, and paper treated with melamine resin to improve its strength and resistance to scuffing when wet. Some of the materials were reinforced with scrim cloth or strands of fibers imbedded in the laminating asphalt. The other materials were made of various other kinds of sheetings, the details of which are in Table II.

The components comprised the basic materials used in the manufacture of caselining papers, kraft paper and asphalt. Four adhesives used to seal caseliners were also tested.

Testing Methods

Tests for the properties of the caselining materials before exposure to the tropical conditions were made as a part of the investigation described in the first report. Parts of the same samples used for those tests were used for the mildew tests. Because of the limitation of space in the tropical room, exposure of enough sample sheets to be thoroughly representative of the material being tested was not possible. Each exposed test sample of the sheet materials consisted of four sheets 14 by 15 inches each. For testing the adhesives, sheets 3 inches by 1 inch were cut from liners across seams sealed with the adhesives. The sheets were hung in a room maintained under tropical conditions and one sheet of each sample was removed at the end of successive 4-week periods for examination and testing, except that a few sheets, through error, were not removed at the proper time.

The conditions in the tropical room were as follows:

The temperature was maintained at 75 ± 1°F. for a period of 6 hours and at 85 ± 1°F. for the other 18 hours in each 24-hour period. The relative humidity was held at 95 ± 2% during the 6-hour period at 75°F. and then lowered to 90 ± 2% while the room was at 85°F. Condensation occurred as the temperature changed and small droplets of water condensed in all parts of the room. In addition to the fungi present in the atmosphere, the room and contents were inoculated with 24 species of fungi at the time of starting the operation of the room.

At the end of the exposure period, the sheets were examined visually for extent of mildew growth and identification of fungi present, and were tested for deterioration by making tests for decreases from the original weight, strength, stretch, and water resistance of the materials, and for change in their acidity (pH). The tests were made according to the methods of the Technical Association of the Pulp and Paper Industry.

The samples of asphalt and base paper used with them were also subjected to standard pure culture mildew tests.

TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS

Symbols: S — slight, M — Moderate, H — heavy; Ch — *Chaetomium globosum*, Psp — *Penicillium sp.*; O — absent, + — present

Group 1.—Asphalt-laminated Kraft Papers, Not Reinforced, and with Untreated Component Sheets.

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Mildew: Ch	Mildew: Psp
	Sample A. Triplex, All Sheets Creped						
4	0	0	10	0	S	O	O
8	10	30	40	0	S	+	O
12	30	30	20	10	S	+	+
16	40	50	50	0	S	O	+
	Sample E. Triplex, One Outer Sheet Creped						
4	30	70	70	70	S	+	+
8	40	60	60	60	S	O	+
12	40	70	60	60	S	+	+
16	50	60	50	50	M	+	+
	Sample H. Triplex, All Sheets Creped						
4	0	10	10	0	S	O	O
8	20	30	30	10	S	+	O
12	0	0	0	0	S	O	O
16	10	40	40	0	S	O	O
	Sample V. Duplex, Both Sheets Creped						
4	10	0	10	0	S	O	+
8	10	10	10	0	S	+	+
12	30	30	20	50	S	O	+
16			no sample				
	Sample HH. Duplex, Both Sheets Creped						
4	0	0	0	0	S	O	O
8	0	20	10	0	S	O	+
12	0	20	0	0	S	O	O
16	10	20	0	0	S	O	+

TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS—(Continued)

Group 2.—Asphalt-laminated Kraft Papers, Not Reinforced, with Component Sheets Infused with Asphalt.

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Mildew: Ch	Mildew: Psp
	Sample B. Triplex, Two Outer Sheets Creped and Infused						
4	0	0	10	0	M	O	+
8	50	50	60	70	H	O	+
12	70	70	50	70	H	O	+
16	50	60	70	70	H	+	+
	Sample D. Duplex Uncreped, One Sheet Infused						
4	0	0	0	0	S	O	O
8	0	30	10	50	M	+	+
12	0	30	10	50	S	O	+
16	20	50	10	30	M	O	+
	Sample J. Duplex, Uncreped, One Sheet Infused						
4	0	20	20	40	S	O	+
8	0	10	10	30	S	+	+
12	0	20	10	50	S	O	+
16	20	50	60	80	M	+	+
	Sample K. Duplex, Both Sheets Creped, One Sheet Infused						
4	0	40	20	60	M	O	+
8	20	30	30	60	M	+	+
12	30	40	20	70	M	O	+
16	50	60	50	60	M	O	+
	Sample S. Duplex, Uncreped, One Sheet Infused						
4	10	20	30	80	S	O	+
8	0	10	30	60	S	+	O
12	30	20	30	60	M	+	O
16	60	60	70	90	H	+	+
	Sample T. Duplex, Both Sheets Creped, One Sheet Infused						
4	0	0	0	10	S	+	+
8	0	0	0	0	S	O	+
12	0	0	0	60	S	O	O
16			no sample				
	Sample W. Triplex, All Sheets Creped and Infused						
4	10	40	30	80	M	+	+
8	0	10	0	60	S	O	+
12	20	50	10	80	M	O	+
16	30	40	30	80	M	O	+
	Sample CC. Triplex, One Outer Sheet Creped and Infused						
4	10	0	20	0	M	O	+
8	20	30	50	30	H	+	+
12	30	0	30	30	H	O	+
16	50	50	60	30	H	O	+

Test Data

General

The various species of fungi found on the caselining materials are listed in Table I. This is not given for the components as the species of fungi were similar in both cases.

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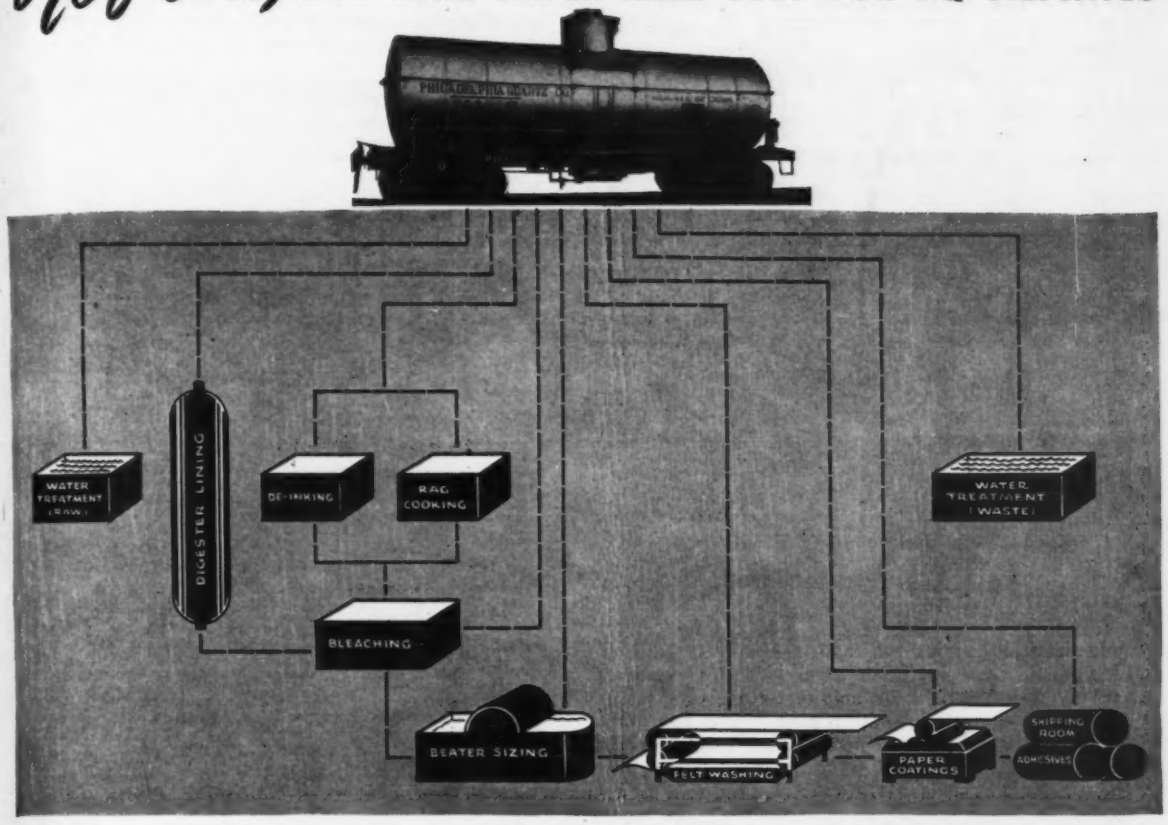

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1. Silica sol coagulant aids (made with N Brand) remove color from fresh water supplies, also clarify white waters. PQ processes available under license without charge.
2. Linings for pulp digesters need acid-resistant cements, the binder for which is S Brand Silicate.
3. De-inking used paper stock with Metso metasilicate produces cleaner, whiter pulp. It does not discolor ground wood.
4. Rag cooking utilizes the effective detergent action of metasilicate . . . results, better color removal, higher final fibre strength.
5. Pulp bleaching (chlorine or peroxide). Brightness is increased. Finished quality improved.
6. Silicate sizing in the beater improves the finish, increases tear and bursting strength. Along with improved quality, substantial savings are often possible.
7. Felts are washed clean with Metso. They are more absorbent and last longer.
8. Coatings for paper. Clays are deflocculated with PQ Silicates. Silicate films are used for greaseproofing paper board.
9. Packaging adhesives. Silicates are odorless, quick-drying, form strong bonds for sealing the ends of paper rolls and paper board shipping cases.

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This is a second report of the results of an investigation made at the request of the Container Coordinating Committee, War Production Board, and with the assistance of funds from the Board's Office of Production Research and Development. The investigation was made for development of standards for caselining materials, the results of which are given in the first report *(1)*, and to find how such materials and their components might behave in tropical regions, particularly with respect to mildewing. This report deals with the latter.

Materials Tested

Thirty-one caselining materials were tested. There were 24 asphalt-laminated kraft papers, made with plain paper, paper infused with asphalt, paper containing waxy materials, and paper treated with melamine resin to improve its strength and resistance to scuffing when wet. Some of the materials were reinforced with scrim cloth or strands of fibers imbedded in the laminating asphalt. The other materials were made of various other kinds of sheetings, the details of which are in Table II.

The components comprised the basic materials used in the manufacture of caselining papers, kraft paper and asphalt. Four adhesives used to seal caseliners were also tested.

Testing Methods

Tests for the properties of the caselining materials before exposure to the tropical conditions were made as a part of the investigation described in the first report. Parts of the same samples used for those tests were used for the mildew tests. Because of the limitation of space in the tropical room, exposure of enough sample sheets to be thoroughly representative of the material being tested was not possible. Each exposed test sample of the sheet materials consisted of four sheets 14 by 15 inches each. For testing the adhesives, sheets 3 inches by 1 inch were cut from liners across seams sealed with the adhesives. The sheets were hung in a room maintained under tropical conditions and one sheet of each sample was removed at the end of successive 4-week periods for examination and testing, except that a few sheets, through error, were not removed at the proper time.

The conditions in the tropical room were as follows:

The temperature was maintained at 75 ± 1°F. for a period of 6 hours and at 85 ± 1°F. for the other 18 hours in each 24-hour period. The relative humidity was held at 95 ± 2% during the 6-hour period at 75°F. and then lowered to 90 ± 2% while the room was at 85°F. Condensation occurred as the temperature changed and small droplets of water condensed in all parts of the room. In addition to the fungi present in the atmosphere, the room and contents were inoculated with 24 species of fungi at the time of starting the operation of the room.

At the end of the exposure period, the sheets were examined visually for extent of mildew growth and identification of fungi present, and were tested for deterioration by making tests for decreases from the original weight, strength, stretch, and water resistance of the materials, and for change in their acidity (pH). The tests were made according to the methods of the Technical Association of the Pulp and Paper Industry.

The samples of asphalt and base paper used with them were also subjected to standard pure culture mildew tests.

TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS

Symbols: S — slight, M — Moderate, H — heavy; Ch — *Chaetomium globosum*, Psp — *Penicillium sp.*; O — absent, + — present

Group 1.—Asphalt-laminated Kraft Papers, Not Reinforced, and with Untreated Component Sheets.

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Ch	Psp
	Sample A. Triplex, All Sheets Creped						
4	0	0	10	0	S	O	O
8	10	30	40	0	S	+	O
12	30	30	20	10	S	+	+
16	40	50	50	0	S	O	+
	Sample E. Triplex, One Outer Sheet Creped						
4	30	70	70	70	S	+	+
8	40	60	60	60	S	O	+
12	40	70	60	60	S	+	+
16	50	60	50	50	M	+	+
	Sample H. Triplex, All Sheets Creped						
4	0	10	10	0	S	O	O
8	20	30	30	10	S	+	O
12	0	0	0	0	S	O	O
16	10	40	40	0	S	O	O
	Sample V. Duplex, Both Sheets Creped						
4	10	0	10	0	S	O	+
8	10	10	10	0	S	+	+
12	30	30	20	50	S	O	+
16	no sample						
	Sample HH. Duplex, Both Sheets Creped						
4	0	0	0	0	S	O	O
8	0	20	10	0	S	O	+
12	0	20	0	0	S	O	O
16	10	20	0	0	S	O	+

TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS—(Continued)

Group 2.—Asphalt-laminated Kraft Papers, Not Reinforced, with Component Sheets Infused with Asphalt.

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Ch	Psp
	Sample B. Triplex, Two Outer Sheets Creped and Infused						
4	0	0	10	0	M	O	+
8	50	50	60	70	H	O	+
12	70	70	50	70	H	O	+
16	50	60	70	70	H	+	+
	Sample D. Duplex Uncreped, One Sheet Infused						
4	0	0	0	0	S	O	O
8	0	30	10	50	M	+	+
12	0	30	10	50	S	O	+
16	20	50	10	30	M	O	+
	Sample J. Duplex, Uncreped, One Sheet Infused						
4	0	20	20	40	S	O	+
8	0	10	10	30	S	+	+
12	0	20	10	50	S	O	+
16	20	50	60	80	M	+	+
	Sample K. Duplex, Both Sheets Creped, One Sheet Infused						
4	0	40	20	60	M	O	+
8	20	30	30	60	M	+	+
12	30	40	20	70	M	O	+
16	50	60	50	60	M	O	+
	Sample S. Duplex, Uncreped, One Sheet Infused						
4	10	20	30	80	S	O	+
8	0	10	30	60	S	+	O
12	30	20	30	60	M	+	O
16	60	60	70	90	H	+	+
	Sample T. Duplex, Both Sheets Creped, One Sheet Infused						
4	0	0	0	10	S	+	+
8	0	0	0	0	S	O	+
12	0	0	0	60	S	O	O
16	no sample						
	Sample W. Triplex, All Sheets Creped and Infused						
4	10	40	30	80	M	+	+
8	0	10	0	60	S	O	+
12	20	50	10	80	M	O	+
16	30	40	30	80	M	O	+
	Sample CC. Triplex, One Outer Sheet Creped and Infused						
4	10	0	20	0	M	O	+
8	20	30	50	30	H	+	+
12	30	0	30	30	H	O	+
16	50	50	60	30	H	O	+

Test Data

General

The various species of fungi found on the caselining materials are listed in Table I. This is not given for the components as the species of fungi were similar in both cases.

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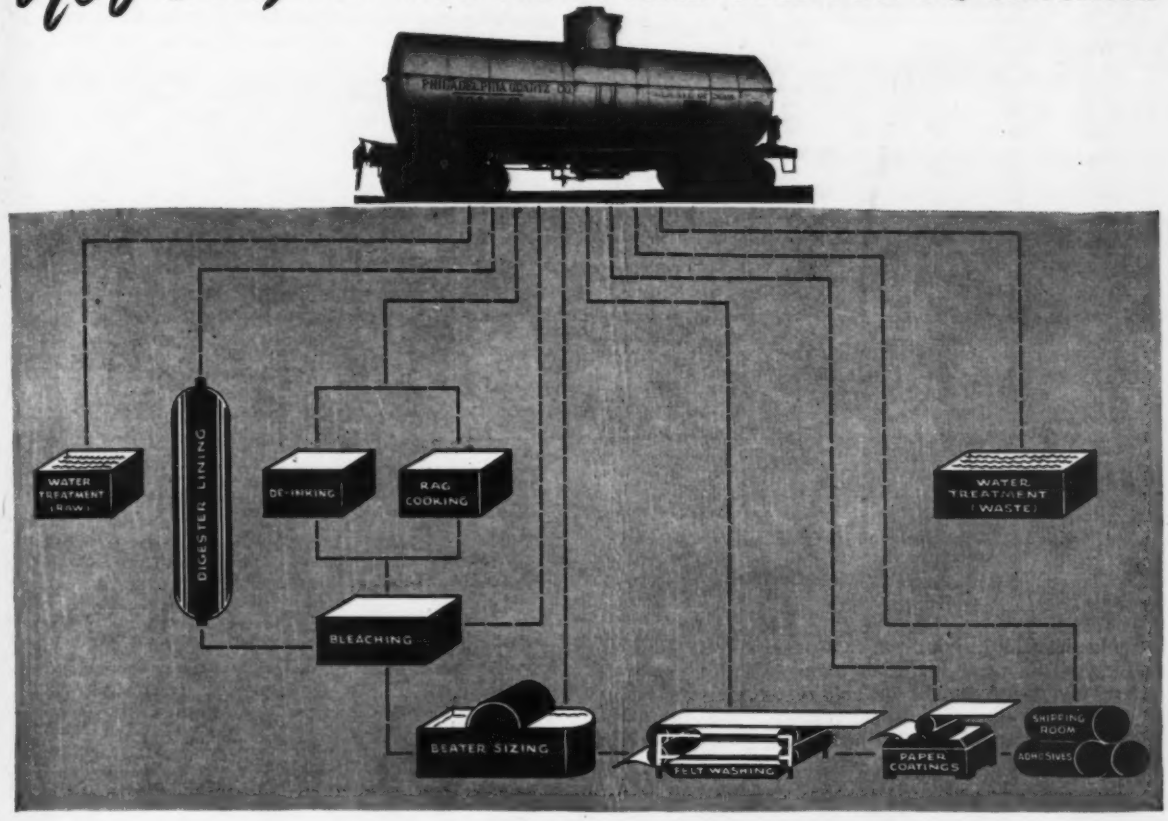

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TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS—(Continued)

Group 3.—Asphalt-laminated Kraft Papers, Not Reinforced, with Component Sheets Having Various Treatments.

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Ch	Psp
Sample M.	Duplex, Uncreped, One Wet-Strength Sheet						
4	10	10	30	40	S	O	+
8	10	20	10	90	S	+	O
12	50	60	70	80	S	+	O
16	60	60	60	90	S	O	+
Sample O.	Triplex, All Sheets Creped, Wet-Strength Outer Sheets						
4	30	20	30	50	S	O	O
8	30	20	30	0	S	O	O
12	20	40	30	0	S	O	+
16	50	50	40	70	S	O	O
Sample AA.	Triplex, One Outer Sheet Creped and Treated for Mold Resistance						
4	0	0	0	0	S	O	O
8	no sample						
12	20	0	0	0	S	O	O
16	20	0	0	10	S	O	O
Sample BB.	Duplex, Both Sheets Creped, One Sheet Wet-Strength and Waxed						
4	10	0	0	0	S	O	O
8	0	0	0	10	S	O	O
12	10	20	20	50	S	O	O
16	30	50	30	60	S	O	O
Sample DD.	Triplex, All Sheets Creped, Outer Sheets Wet-Strength and One Waxed						
4	20	30	0	20	S	O	+
8	no sample						
12	20	40	10	40	S	O	O
16	20	40	10	70	S	O	+
Sample GG.	Duplex, Both Sheets Creped and One Waxed						
4	0	50	0	60	S	O	+
8	40	40	0	80	M	+	+
12	50	60	20	80	M	+	+
16	50	70	60	80	S	+	+

In the tables giving the changes found in the samples of the sheet materials after exposure, no data are given for weight or acidity as there were no appreciable changes in these respects. Because of the method of sampling used in obtaining the specimens for the test made after exposure (see section III above), and because of the variables existing in the tropical room, the decreases shown in strength, stretch, and water resistance must be regarded as qualitative rather than quantitative. For example, statistical analysis of the raw tensile strength data on which the tensile strength ratios in Table II were based, reveals that the accuracy of each of these ratios, as representative of the mean of the particular local section of the material to which the ratio applies, is of the order of about 15% of the value of the ratio. But the accuracy of these ratios as estimates of the mean of any particular material can only be conjectured, and their accuracy as estimates of the long-term means that would be obtained in many successive repetitions of the entire exposure cycle is similarly unknown. For these reasons, all the ratios in the tables have been rounded off to the nearest 10, with the understanding that the resulting values will be interpreted by the reader as a sort of code, to facilitate a rough qualitative comparison. It is to be emphasized that the rounded ratios are not to be considered as accurate to within an additive factor of ±5, which is the more customary interpretation of measures rounded in this way.

To facilitate comparison of the decreases with mildewing, the tables also show the amount of mildew growth, and the presence or absence of *Chaetomium globosum* and *Penicillium sp.*, two of the fungi that appear to have a significant relation to the deterioration of the materials. Considering the data as a whole, they show a relation between the deterioration of the materials, the amount of mildew growth, and the presence or absence of the two fungi mentioned. For the reasons given before, consistent data of this kind cannot be expected. However, this relation is evident in the data for about 80% of the test specimens. Further evidence that the deterioration was caused primarily by mildew was obtained by exposing specimens of papers that had deteriorated considerably in 8 weeks in the tropical room, for the same

TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS—(Continued)

Group 4.—Asphalt-laminated Kraft Papers, Reinforced.

Weeks of Exposure	Percentage Decreases from Original: Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Ch	Psp
Sample C.	Duplex, Both Sheets Creped, Reinforced with Sisal Fiber					
4	30	30	50	S	+	+
8	50	60	20	M	+	+
12	30	40	40	M	+	+
16	50	40	20	M	+	+
Sample F.	Duplex, Uncreped, Reinforced with Sisal Fiber					
4	40	0	50	S	+	O
8	60	30	30	M	+	+
12	60	0	60	M	+	+
16	60	0	30	M	+	+
Sample G.	Duplex, Uncreped, Reinforced with Jute Scrim					
4	60	0	80	S	+	O
8	60	40	90	S	+	O
12	70	10	90	S	+	+
16	80	0	90	M	+	+
Sample U.	Duplex, Both Sheets Creped and Wet-Strength, Reinforced with Sisal Fiber					
4	30	10	50	H	+	+
8	50	10	60	H	+	+
12	40	20	70	S	+	+
16	60	10	60	M	+	+
Sample EE.	Duplex, Both Sheets Creped and Wet-Strength, Reinforced with Sisal Fiber					
4	20	30	40	S	+	+
8	50	50	30	M	+	+
12	50	50	40	M	+	+
16	50	40	60	M	+	+

Note 1. Tearing resistance could not be determined because of interference of the reinforcing materials.

Note 2. In nearly all instances, the mildew was heavier on the lines of the reinforcing material than on the other part of the sheet.

TABLE II.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON CASELINING MATERIALS—(Continued)

Group 5.—Miscellaneous Caselining Materials.

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance	Mildew: Amount	Ch	Psp
Sample P.	Uncreped, Three Sheets Cotton Cellulose Impregnated with Asphalt						
4	60	60	50	70	H	+	+
8	60	80	70	60	H	+	+
12	70	80	60	70	H	+	+
16	80	90	80	90	H	+	+
Sample Q.	Uncreped, Two Sheets Cotton Cellulose Wadding Heavily Impregnated with Asphalt and One Side Coated with Asphalt						
4	50	60	70	60	H	+	+
8	60	80	80	60	H	+	+
12	60	70	50	60	H	+	+
16	70	90	80	80	H	+	+
Sample R.	Uncreped, Three Sheets Cotton Cellulose Wadding Heavily Impregnated with Asphalt						
4	30	50	60	70	H	+	+
8	50	70	70	80	H	+	+
12	60	70	60	80	H	+	+
16	70	90	70	90	H	+	+
Sample X.	A Sheet of Kraft Paper with Lead Foil Laminated to It On One Side with Asphalt, and Cotton Scrim Cloth Laminated On the Other Side of the Paper with Cement						
4	The cloth was completely separated from the paper and had a heavy growth of mildew with *Chaetomium globosum* and *Penicillium sp.* present. These fungi were also on the foil, but the growth was light.						
Sample Z.	Cotton Cloth Coated One Side with Vinyl Resin						
4	..	20	0	0	H	+	+
8	..	40	0	0	H	+	+
12	..	40	0	0	H	+	+
16	..	60	0	0	H	+	+
Sample FF.	One Creped Kraft Sheet Laminated to Cellophane with Asphalt						
4	0	20	50	60	S	O	O
8	0	30	60	70	M	O	+
12	0	40	70	80	M	O	+
16	50	80	70	90	H	+	+
Sample II.	Kraft Paper Laminated to Both Sides of Cellophane Sheet with Asphalt						
4	0	20	20	0	M	O	+
8	0	0	0	0	S	+	+
12	0	20	0	0	S	O	+
16	40	50	70	40	S	O	+

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TABLE III.—RATE OF DETERIORATION OF 18 ASPHALT-LAMINATED KRAFT CASELINING PAPERS EXPOSED IN TROPICAL ROOM

Following is the number of specimens for each period of exposure showing practically no decrease or moderate decreases from the original strength, stretch and water resistance of papers without reinforcing material. The last column gives the number that had no decreases in any of these respects.

Degree of Decreases	Strength	Stretch	Water Resistance	No Decreases in Strength, Stretch and Water Resistance
		4 Weeks Exposure		
None	10	10	9	8
Moderate	4	6	1	
		8 Weeks Exposure		
None	7	9	7	3
Moderate	8	4	2	
		12 Weeks Exposure		
None	2	6	5	1
Moderate	6	9	1	
		16 Weeks Exposure		
None	0	3	3	0
Moderate	2	3	2	

period in a sterile room maintained at 95% relative humidity and 85°F. These papers are designated in Table II as E, group 1; B and K, group 2; O and GG, group 3; G, group 4. After exposure in the sterile room, no mildew was present on the specimens and no significant changes in weight, tearing resistance, tensile strength, stretch, and water resistance had occurred.

Caselining Materials

The effects of the exposure to tropical conditions on the properties of the caselining materials are shown in Table II. Following is a discussion of these data.

Asphalt-Laminated Kraft Papers. Infusion with asphalt and with waxy materials, and treatment with melamine resin for high wet strength apparently had little bearing on the resistance of the papers to deterioration. The papers containing strands of sisal or jute scrim were much less resistant to mildew than those that did not have these reinforcing materials present, and it was noticed that the mildew growth was heavier on the lines of the reinforcing material than on the other parts of the sheets. In Table III are listed the number of specimens of eighteen unreinforced papers showing practically no decrease or moderate decreases in strength, stretch and water resistance at the end of each period of exposure. The table shows that of these papers, those unaffected in these respects numbered at the end of 4 weeks exposure, eight; 8 weeks, three; 12 weeks, one; and 16 weeks, none. The reinforced papers, group 4, all deteriorated considerably during the first period of exposure and the deterioration continued rapidly during the subsequent periods of exposure. The maximum percentage decreases found for the laminated papers are: tearing resistance, 70; tensile strength, 80; stretch, 70; water resistance, 90.

Miscellaneous Caselining Materials. Cotton cellulose wadding, heavily impregnated with asphalt deteriorated very rapidly, the decreases in strength, stretch and water resistance being very large after 4 weeks exposure, and the decreases continued rapidly during the other periods of exposure. All specimens were heavily covered with mildew, especially *Chaetomium globosum* and *Penicillium sp.* This was also true of cotton scrim cloth cemented to metal foil, separation of the plies occurring during 4 weeks exposure. Apparently cotton is much less resistant than kraft fibers to the effects of mildew.

Cotton cloth, coated on one side with vinyl resin, had a heavy growth of mildew, with *Chaetomium globosum* and *Penicillium sp.* present, on all specimens. It lost a large part of its tensile strength but its water resistance did not decrease.

Two sheetings composed of cellophane laminated to kraft paper with asphalt had no loss in tearing resistance until exposed 16 weeks. One of these, a duplex sheet, deteriorated very rapidly in tensile strength, stretch, and water resistance, while the other sample, composed of kraft paper laminated with asphalt to both sides of cellophane, showed little deterioration in these respects until after 16 weeks exposure. On most specimens, the mildew was heavier on the cellophane side of the duplex sheet than on the paper side.

Components of Caselining Materials

Base Papers. The base papers tested consisted of three representative samples each of infusing and laminating kraft papers, both creped and uncreped, used in the manufacture of caselining papers. The infusing papers are those used for impregnation with asphalt. The laminating papers are not intended for infusing. Both types are used for making the asphalt laminated caselining papers.

The test data showing the effects of exposure to tropical conditions on the properties of the base papers are contained in Table IV. Considering the data as a whole, the deterioration of the base papers was much more rapid, and much greater relative to the amount of mildew present, than was found for asphalt-laminated caselining papers containing no reinforcing material. This indicates that the high moisture and temperature conditions of the tropical room were in themselves more important factors in the deterioration of the base papers than in that of the asphalted papers.

Base Paper and Asphalt. To obtain further information on asphalt and base paper, 60-pound (per 3000 square feet) kraft base paper was coated with asphalt fractions of different softening points, and the coated sheets were exposed to the tropical conditions. The samples of asphalt were obtained through the courtesy of Frank R. Field, Standard Oil Company of New Jersey. The fractions were all from the same petroleum crude. The coated papers were prepared under the direction of W. Stanley Seaman,

TABLE IV.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON BASE-PAPERS OF ASPHALTED CASELINING PAPERS

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Mildew [1]: Amount	Ch	Psp
		Sample B-1. Plain Infusing				
4	40	60	80	H	O	+
8	80	100	100	H	+	+
12	80	90	80	H	+	+
16	70	90	100	H	O	+
		Sample S-1. Plain Infusing				
4	20	40	0	M	+	+
8	50	80	50	M	+	+
12	40	80	50	M	+	O
16	40	60	50	M	+	+
		Sample T-1. Creped Infusing				
4	0	0	0	S	O	O
8	50	60	30	S	O	O
12	50	60	30	S	O	O
16	40	50	30	S	+	O
		Sample CC-3. Plain Laminating				
4	0	0	20	S	O	O
8	50	90	80	S	O	+
12	40	90	100	S	+	+
16	40	60	60	S	+	O
		Sample V-1. Plain Laminating				
4	0	20	0	S	+	+
8	50	80	80	S	O	+
12	40	80	100	S	+	O
16	50	70	80	S	+	O
		Sample BB-2. Creped Laminating, Treated for Wet Strength				
4	0	20	20	S	+	O
8	60	70	50	S	O	O
12	50	60	50	S	+	O
16	40	70	60	S	+	O

[1] For explanation of symbols see Table II.

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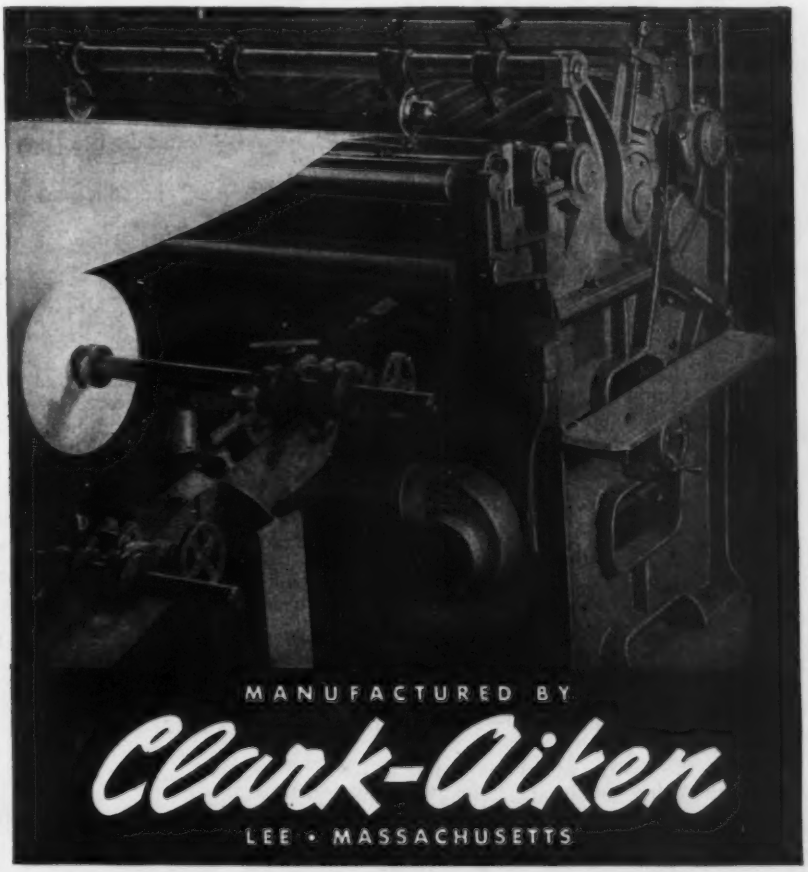


Angier Sales Corporation. The paper was coated with their small experimental laminating machine, and it was found difficult to control the evenness of the coatings and the weight of the coatings of the asphalt fractions. These further variables should be taken into account in analyzing the test results given in Table V. The data indicate, however, that the rate of deterioration increased with increase in the softening point of the asphalt, and that the rate was rapid for all samples. In general the mildew growth was somewhat heavier, and *Chaetomium globosum* and *Penicillium sp.* were somewhat more prevalent on the uncoated side than on the asphalted side of the sheets.

A further test was made by subjecting the asphalt fractions and paper separately to pure culture tests, a method commonly used for testing the relative resistance of materials to mildew.

The culture medium was made up as follows:

NH_4NO_3, g.	3.0
K_2HPO_4, g.	2.0
KH_2PO_4, g.	2.5
$MgSO_4 \cdot 7H_2O$, g.	2.0
Sucrose, g.	30.0
Agar, g.	20.0
Distilled water, ml.	1000.0

The culture medium was melted and sterilized in an autoclave for 20 minutes at a pressure of 15 p.s.i. and 121°C. exhaust temperature. The cooled (but still liquid), sterile agar medium was then poured into sterile 10-cm. petri dishes under aseptic conditions. The plates were left undisturbed until the agar medium had hardened.

For the inoculum, a ripe, fruiting culture of *Aspergillus niger* (USDA 215-4247) or *Penicillium citrinum* (NBS-11) was used for the particular test. The hardened agar medium in each plate was inoculated by first loading a sterile camel's hair brush with spores from the inoculum and then uniformly brushing the surface of the agar medium. The inoculated petri dishes were incubated for a period of 42 to 48 hours at a temperature of 28 to 30°C. and a relative humidity of 85 to 90%, until the white mycelium was evident over the entire surface of the agar medium. At this point specimens of the harder asphalts measuring roughtly 1½ × 1½ inches × ½ inch, were dipped in distilled water and laid firmly on the mycelial mats. In the case of the softer asphalts, 1 ml. distilled water was then pipetted on each specimen after it had been placed on the mycelial mat. The specimens were then incubated for 14 days at a temperature of 28 to 30°C. and a relative humidity of 85 to 90%. Controls consisting of material which was known to support a growth of *Aspergillus niger* or *Penicillium citrinum* was used to verify the viability of the organisms. At the end of 14 days the controls were completely covered with the particular test organisms used. However, the test specimens showed little or no growth of either test organism. Therefore, it was decided to extend the incubation period to 21 days. The increased incubation period showed no significant change in the results obtained after 14 days of incubation. Although the degree of mildew growth on the test specimens was extremely insignificant, there was a noticeable trend. Samples of higher melting points appeared to be more susceptible to mildew growth than lower melting points, which accords with the results of the exposure in the tropical room.

When the kraft paper was exposed for 7 days under the same conditions, it became coated with a heavy growth of mildew, with *Chaetomium globosum* and *Aspergillus niger* predominating and a lesser amount of *Penicillium citrinum* present.

TABLE V.—EFFECT OF EXPOSURE IN TROPICAL ROOM ON 60-POUND[1] KRAFT PAPER COATED WITH ASPHALT

Weeks of Exposure	Percentage Decreases from Original: Tearing Resistance	Tensile Strength	Stretch	Water Resistance[2]	Water Resistance[3]	Mildew[4]: Amount	Ch	Psp
Sample No. I. Asphalt: 75 Pounds[1]; Softening Point, 125° F.								
4	20	30	30	0	0	S	O	+
8	30	60	60	0	0	S	+	+
12	40	60	60	30	0	S	+	+
Sample No. II. Asphalt: 75 Pounds; Softening Point, 173° F.								
4	30	40	30	0	70	S	O	+
8	50	50	50	0	50	S	O	O
12	60	70	70	0	30	S	+	+
Sample No. III. Asphalt: 90 Pounds; Softening Point, 232° F.								
4	30	40	50	30	70	M	O	+
8	30	50	70	10	70	S	+	+
12	50	60	60	40	90	S	+	+
Sample No. IV. Asphalt: 100 Pounds; Softening Point, 293° F.								
4	40	50	60	20	80	M	O	+
8	30	40	70	90	50	H	+	+
12	50	70	70	90	90	M	+	+

[1] Per 3,000 square feet.
[2] Asphalt side in contact with water.
[3] Paper side in contact with water.
[4] For explanation of symbols see Table II.

Adhesives of Caseliners

Exposures of samples of caseliner seams to the tropical conditions were made to find the effect on the adhesives used for the seams. The caseliners were made by machine by four manufacturers from the caselining papers designated A, V, E, and O.

The tests of the seams were made by a method now under consideration by TAPPI and A.S.T.M. Specimens 1-inch wide were cut across the seams so that the strips extended about 1½ inches from each side of the seams. The test for adhesiveness was made by gently pulling the projecting ends of the paper apart with the fingers until the joint separated, then estimating the per cent of failure of the seam that occurred without fiber failure of the surface of the paper of the seams. After exposure in the tropical room the specimens were dried at 23°C. and were tested both in this condition and after immersion in water for 24 hours.

The adhesives were described as follows:

Designation of Caselining Paper	Adhesive
A	Hot-melted compounded asphalt containing rubber.
V	Emulsion type, rubber base.
E	Solvent solution of rubber reclaim and synthetic resins.
O	Hot-melted componunded asphalt containing resin.

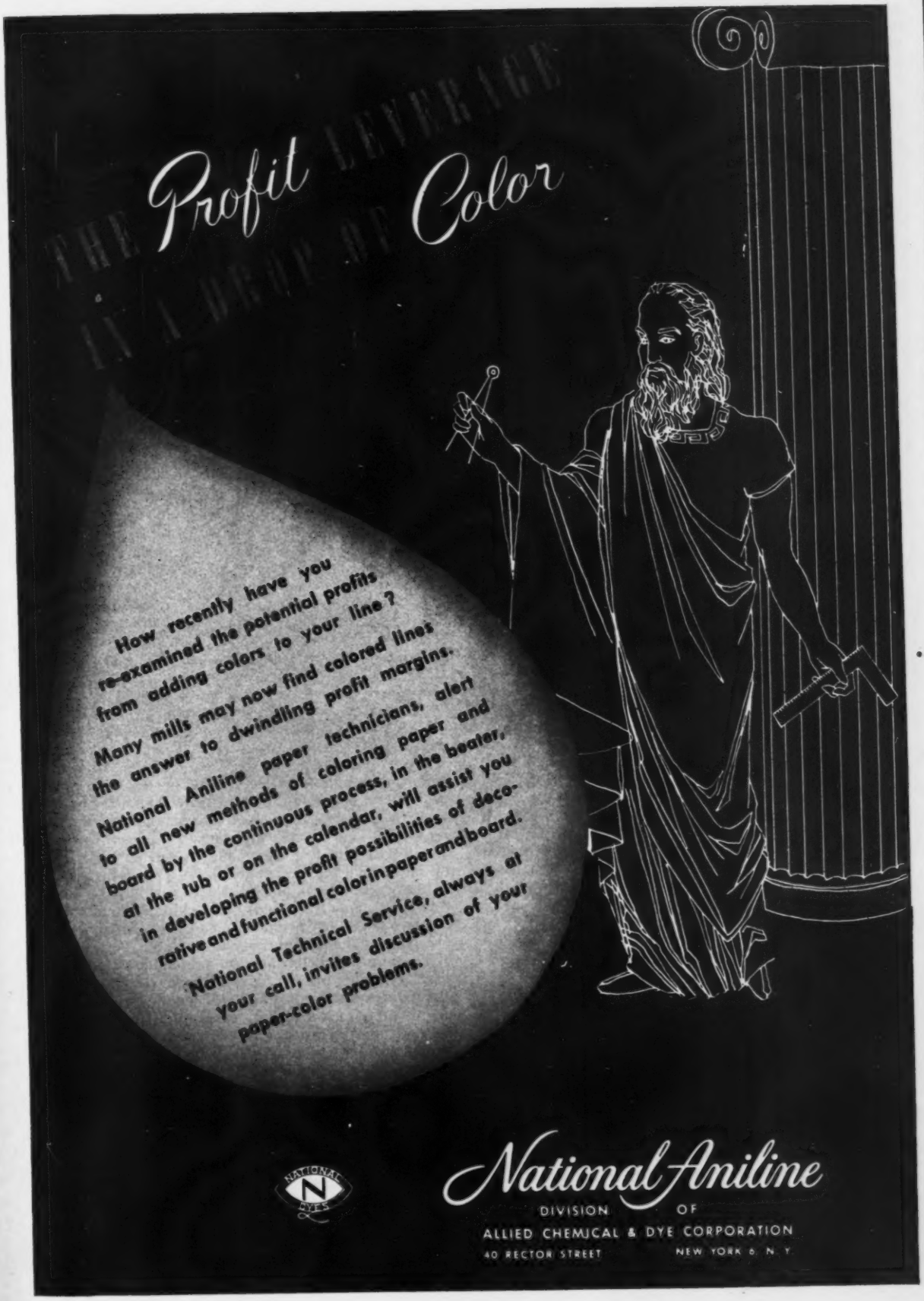
The adhesives all behaved in a similar manner. They showed excellent initial adhesion which did not change significantly throughout the various periods of exposure. The per cent of failure of the seams without fiber failure of the paper ranged from 5 to 9% for the dry specimens and 1 to 5% for the wet specimens. There was only slight mildew growth on the seams until 12 weeks exposure and, except for one specimen, no growth of *Chaetomium globosum* or *Penicillium sp.* was noted until that time.

Acknowledgment

The authors express their appreciation of the identification of the fungi growths on the exposed papers by Miss Marian Zametkin, and the physical testing performed by Mrs. Irma G. Callomon and Alice J. Adams.

Literature Cited

1. Scribner, B. W., and Abrams, E., *Modern Packaging* 19, No. 8: 161 (April, 1946); No. 9: 150 (May, 1946).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Some Properties of Insulation Made From Caroa Fiber

Electrical Insulation—Part II

By Reavis C. Sproull[1]

Abstract

A paper was developed using caroa fiber that had much the same electrical characteristics as are made with manila and was a successful replacement for manila paper for turn insulation. Test data are given.

One of the principal insulations used in electrical devices, especially those which require liquid insulation, is paper. Its dielectric properties, chemical stability, physical form, and low cost all contribute to its desirability. In the many electrical devices in which it is used, however, it is exposed to a wide variety of conditions, and its use may sometimes be prohibited by its behavious in liquid dielectrics or air at elevated temperatures.

Among the many electrical applications for paper, its use as turn insulation for conductors in cables and transformer coils is one of the most important. Manila fiber is frequently used to manufacture this insulation. When the Japanese invasion shut off the supply of manila fiber from the Philippines, it was considered advisable to seek a source of fiber indigeneous to the Americas that could be converted into suitable turn insulation.

Caroa fiber, which exists in great abundance in Brazil, seemed to have the desired inherent qualities. The work of Shaw and Rumsey *(1)* and of Brown *(2)* had shown that papermaking fiber can be obtained from the caroa plant. Their processes were too drastic for use on the caroa fiber and a low yield was the result. To obtain a more economical yield, the procedure described by Sproull *(3)* was followed. This process gave a yield of 50% of clean, uniform fiber that could be readily converted by conventional methods into paper suitable for turn insulation. A comparison with kraft of the papermaking qualities of this fiber and the physical characteristics of a 0.003 in. thick paper has been given *(3)*.

As the principal object of this work was to develop a paper equal to or better than manila for turn insulation, its physical and electrical characteristics were compared with manila of the same nominal thickness.

Physical Qualities

The physical characteristics of the manila and caroa papers studied are shown in Table I. These tests were made after conditioning at 50% R.H. and 72°F. The caroa paper used was the same as that described by Sproull *(3)*.

These results suggest that greater absorbency and greater flexibility with a sacrifice in physical strength may be obtained by use of the caroa fiber. This conclusion was qualitatively confirmed when the caroa was used to cover rectangular wire, and when it was successfully converted by resin impregnation to cylindrical tubes. It conformed nicely to the uneven surface of the wire and made a superior laminated tube. Although the physical strength of the caroa was lower than that of the manila, no difficulty was experienced on covering wire with it.

Contamination and Ageing

When the two papers were soaked in the liquid dielectric, chlorinated diphenyl (askarel) at 100 to 105°C. for 92 hours, and the paper was removed, the power factor was 3.8% for the extract from the manila and 2.8% for the extract from the caroa. Both of these results are satisfactory and indicate that each of these papers is sufficiently stable to the action of the chlorinated diphenyl.

Twelve strips of 0.5 inch wide paper were put into 1-inch diameter test tubes, and vacuum (less than 500 microns) heat dried at 100 to 110°C. for 72 hours, the first 24 hours was a broken vacuum, the last 48 hours was a high continuous vacuum. At the completion of this cycle the temperature was lowered to 50°C. and the samples flooded with chlorinated diphenyl under vacuum. The tubes were heated to about 100°C. and sealed. These sealed tubes were placed in an oven to age at 125 ± 5°C.

At definite intervals, determined as the results were acquired, one test tube containing each of the papers was removed, and, after cooling, was broken. Viscosity measurements were made on the paper and acidity determinations were made on the chlorinated diphenyl. For the viscosity measurements the samples were first washed in trichlorbenzene and solvatone to remove the chlorinated diphenyl.

The viscosity test was made on the washed paper by the method of Straus and Levy *(4)*. The acidity of the chlorinated diphenyl was determined by titration with standard sodium hydroxide. A blank without paper was aged and tested to check any thermal breakdown of the diphenyl into acid.

The viscosity determination was made at intervals over a period of 370 days. These results are an empirical measure of the chain length or degree of degradation of the cellulose. Results on the same fiber are more comparable with each other than results on different fibers. In Table II are listed the viscosity ratios obtained. By use of a factor these values can be converted to centiposes. As this factor

TABLE I.—PHYSICAL CHARACTERISTICS

Fiber, grade	Manila Manila rope	Caroa Batido caroa-Brazil
Thickness, inches	0.00310	0.00303
Apparent density, g./cc.	0.67	0.58
Basis weight (24×36—500)	31.9	27.1
Tensile, lb./100 lbs.	139	88
Tear, g.	240	112
Stretch, in./100 in.	3.2	3.6
Air resistance, cc./15 sec.	56	73
Bursting strength, lb./sq. in.	—	39
Stiffness factor *	148	116

* This is an empirical figure, the higher the value the greater being the stiffness.

[1] Member TAPPI; Chemist-Engineer, Works Laboratory, General Electric Co., Pittsfield, Mass.

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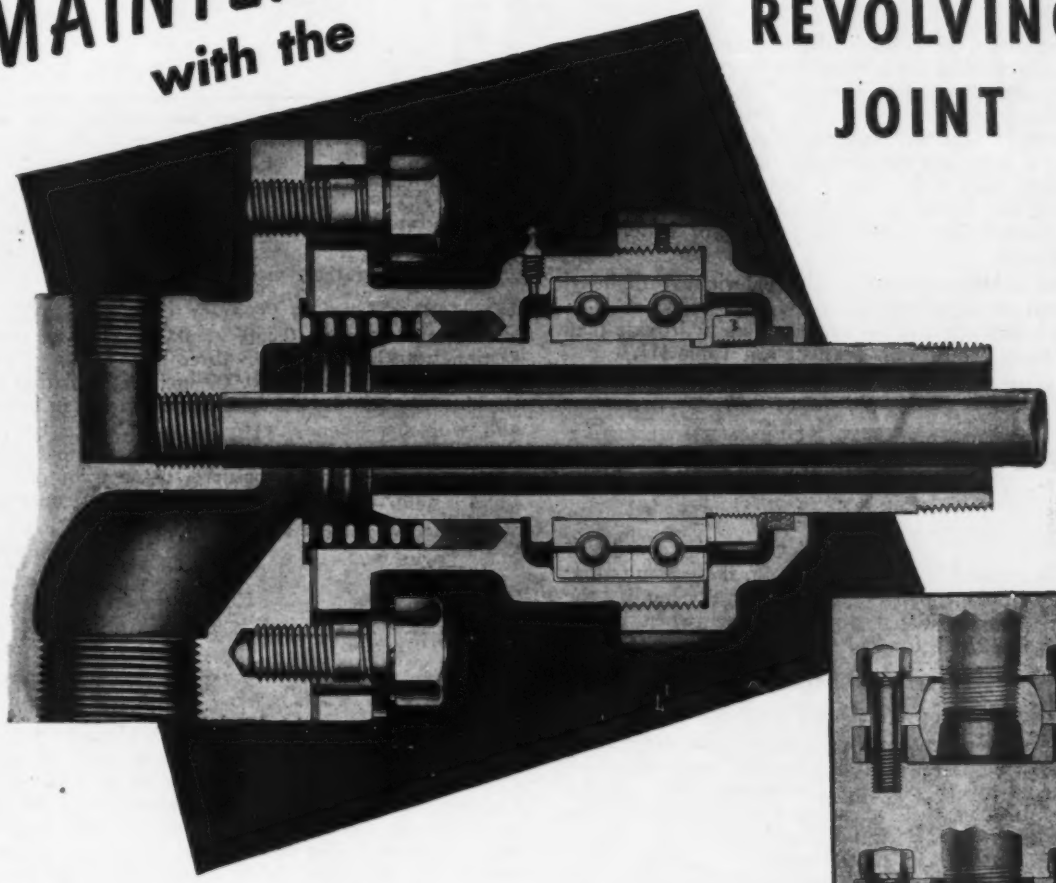

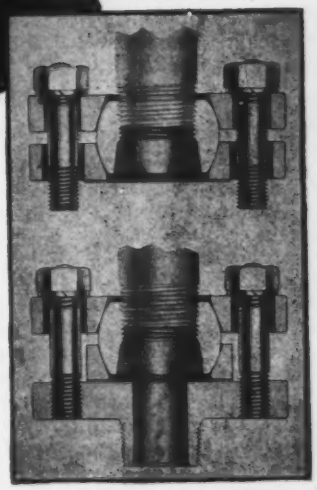

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TABLE II.—VISCOSITY RATIO AND PER CENT VISCOSITY WITH AGING TIME

Time, days	Caroa		Manila	
	Viscosity Ratio	Viscosity, %	Viscosity Ratio	Viscosity, %
0	589	100	863	100
7	...	...	583	68
21	468	80	442	51
35	405	69	440	51
63	376	64	404	47
132	375	64	288	33
264	356	60	264	31
370	279	47	261	30

has not been well established for this type of study, it was considered advisable not to convert. In this table, the "per cent viscosity" is determined by dividing the viscosity at any chosen time by the viscosity at zero time and multiplying by 100. Figures 1 and 2 show how the viscosity ratio and the per cent viscosity vary with time of ageing. From these results it may be safely concluded that the caroa paper ages under these conditions as well or better than the manila.

The acidity results on the chlorinated diphenyl showed no significant change for 264 days. All of the samples required no more sodium hydroxide than the blank. The results are listed in Table III.

TABLE III.—ACIDITY OF CHLORINATED DIPHENYL AFTER 264 DAYS OF AGING

Time in Days at 125° C.	Mg. Sodium Hydroxide per Gram of Chlorinated Diphenyl × 10^3		
	Caroa	Manila	Blank
7	3	3	3
21	3	3	3
35	3	3	3
63	5	3	5
264	3	3	5

It is reasonable to conclude from these results that neither of these papers would materially modify the acidity of chlorinated diphenyl, even when heated with it at 125°C. for 264 days.

Electrical Characteristics

Power Factor of the Dry Paper

The power factor of the paper was determined after drying at 100 to 105°C. for 16 hours in a good vacuum between perforated electrodes with parallel faces. In a test cell constructed in this manner, the paper serves as an insulator as it would in a stamp capacitor. After drying the paper, dry air was introduced by way of a suitable drying train, and as the samples cooled, power factor measurements were made. The results are shown in Table IV.

Although these results seem to indicate that the caroa has the lower per cent power factor, if allowance is made for difference in density, the results are almost identical up to 80°C. The factor of 1.15 should be used to convert from the density of the caroa to the density of the manila. Figure 3 shows the dry power factor vs. temperature without any consideration of the density.

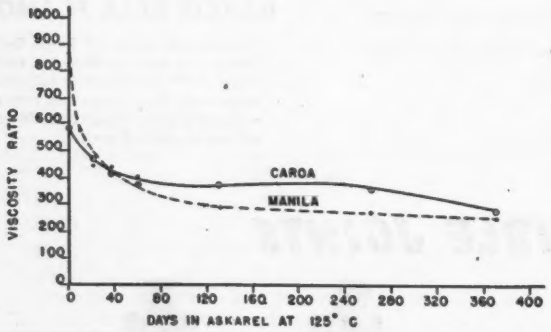

FIG. 1
Viscosity Ratio of Manila and Caroa on Aging in Askarel

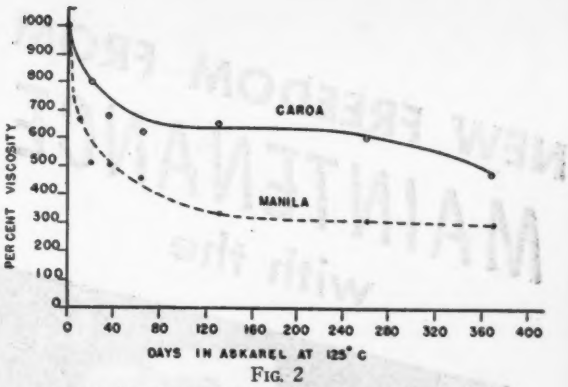

FIG. 2
Per Cent Viscosity of Manila and Caroa on Aging in Askarel

Dielectric Strength of Wire Pairs

Rectangular wire, 0.250 × 0.075 inch in cross section, was insulated with three butt wraps of the paper, making a total of 0.009 inch of insulation on the side. From this, wire pairs of 12 inches in length and with flared ends were prepared. The flat or wider sides were firmly bound together so that good contact of surfaces was assured. A view of one of these is shown as item B in Fig. 4. In this construction there was 0.018 inch of paper insulation between conductors. These wire pairs were then vacuum dried and impregnated with mineral oil or chlorinated diphenyl. While immersed, they were tested for 60 cycle rms and impulse breakdown by using 1½-40 negative wave. The flared ends served as contact points. The results of Table V were obtained. These tests gave very nearly identical results with the two papers and suggested further tests on larger test units.

TABLE IV.—POWER FACTOR OF THE DRY PAPER

Temperature, °C.	Power Factor × 10^3	
	Per Cent Caroa	Manila
30	142	162
40	137	157
50	135	155
60	133	155
70	133	157
80	137	165
90	143	177
100	156	205

Dielectric Strength in Seven-Layer Test Coils

Because of the results obtained with the wire pairs, the study was continued by constructing seven-layer test coils of 2⅞ inch ID × 4⅛ inch OD × 4 inch long. The wire used in this coil was 0.095 × 0.065 inch with three layers of butt wrapped paper as turn insulation, 0.009 inch on a side, and 0.010 mil. Water-finished kraft was used as layer insulation wherever layer insulation was used. This coil construction is shown as Item A in Fig. 4. Impulse, 1½-40 negative

TABLE V.—DIELECTRIC STRENGTH OF WIRE PAIRS

Sample		Mineral Oil		Chlorinated Diphenyl	
		60-Cycle	Impulse	60-Cycle	Impulse
Caroa		21.0 kv.	35.0 kv.	21.0 kv.	40.0 kv.
		21.0	38 0	21.0	40.0
		16.5	38.0	21.0	38.0
	av.	19.5 kv.	37.0 kv.	21.0 kv.	39 3 kv.
		1083 vpm.	2050 vpm.	1168 vpm.	2180 vpm.
Manila		18.0 kv.	30.0 kv.	19.0 kv.	38.0 kv.
		19.0	33.0	20.0	42.0
		20.0	34.0	21.0	37.0
	av.	19.0 kv.	32 3 kv.	20 0 kv.	39.0 kv.
		1055 vpm.	1795 vpm.	1110 vpm.	2160 vpm.

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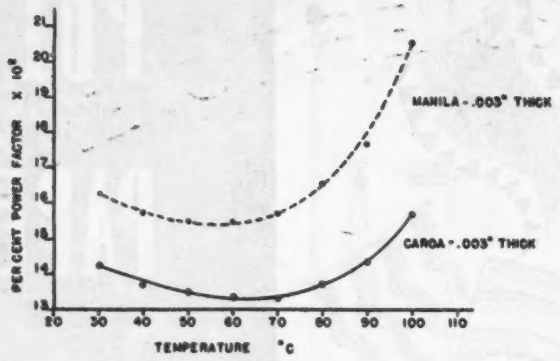


FIG. 3

Dry Power Factor of Manila and Caroa Paper over a Normal Temperature Range

wave, and 60 cycle, rms breakdowns were made on turn-to-turn and layer-to-layer positions in the coil. The results of Table VI were obtained.

TABLE VI.—DIELECTRIC STRENGTH IN SEVEN-LAYER COILS

Wire Number	Position of Test	60-Cycle RMS (kv.)	Impulse (kv.) 1½-40 Neg. Wave
	Manila		
1-2	turn to turn	8.8	22.5
7-9	turn to turn	10.8	27.5
13-14	turn to turn	11.0	29.3
Average	turn to turn	10.2	26.4
3, 4-5, 6.....	layer to layer	21.7	43.8
9, 10-11, 12....	layer to layer	26.5	47.7
Average	layer to layer	24.1	45.8
	Caroa		
1-2	turn to turn	...	38.0
7-8	turn to turn	25.0	38.0
13-14	turn to turn	20.0	38.0
Average	turn to turn	22.5	38.0
3, 4-5, 6.....	layer to layer	22.0	62.0
9, 10-11, 12....	layer to layer	22.0	52.0
Average	layer to layer	22.0	57.0

The 60 cycle results on the turn-to-turn tests for manila are lower than is usually found, whereas the results on manila are expected to be much higher. This value is usually about 20 to 22 kilovolts. Even if these low results for manila are excluded, the caroa is equal to or better than the manila on all of the tests.

Dielectric Strength in Large Coils

To make the comparison on a factory basis, six large single-section coils were wound in the factory according to normal factory practice. These coils were made up of 0.250 × .075 inch wire with three layers of butt wrap insulation and with one wrap of 3.5 mil cotton to hold the paper in place. Impulse tests made in dry mineral oil at room temperature gave the results shown in Table VII.

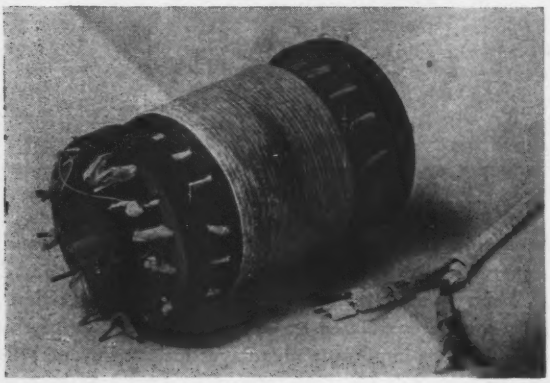


FIG. 4

Examples of Test Units
A. (Left)—Seven-Layer Test Coil. B. (Right)—Wire Pair with Paper Exposed

TABLE VII

Construction—3 wraps 0.003 in. manila 1 wrap 0.0035 in. cotton	Breakdown (kv.)	Construction—3 wraps 0.003 caroa 1 wrap 0.0035 cotton	Breakdown (kv.)
	35.0		37.0
	35.0		38.0
	35.5		37.0
	35.0		39.0
	35.0		35.0
	32.0		37.5
			37.0
Average	34.6		35.0
Average vpm.*	1300		
		Average	36.9
		Average vpm.*	1370

* This calculation is based on 27 mils of insulation between the conductors.

Again, the dielectric strength on the coils insulated with caroa is equal to that of the coils insulated with manila.

Conclusions

1. Caroa paper made as described has very much the same electrical characteristics as manila, both in 60 cycle and in impulse breakdown in mineral oil and chlorinated diphenyl.
2. Caroa paper ages satisfactorily in chlorinated diphenyl at 125°C.
3. Caroa paper has been shown as a successful replacement for manila paper for turn insulation.

Literature Cited

1. Shaw and Ramsey, *Paper Trade J.* 80, No. 2: 47 (1924).
2. Brown, U. S. patent 1,725,335.
3. Sproull, R. C., *Paper Trade J.* 120, No. 25: 127-128 (June 21, 1945).

TAPPI Notes

Wilbur L. Cassiday, who has been with the New York Office of W. R. Grace & Co., has left for Lima, Peru, where he will be in charge of Paper Converting Development at their plant there.

Col. William A. Kelley, formerly commanding officer at the Lexington Signal Depot, Lexington, Ky., is now with the War Assets Administration, Railroad Retirement Building, Washington, D. C.

Einar Walloe, general pulp mill superintendent of Bloedel, Stewart & Welch Ltd., Vancouver, B. C., is now general superintendent of their new kraft pulp mill at Port Alberni, B. C., Canada.

Robert E. E. Costello, formerly control superintendent, Brompton Pulp & Paper Co., Red Rock, Ont., is now with the Abitibi Power & Paper Co., Sault Ste. Marie, Ont., Canada.

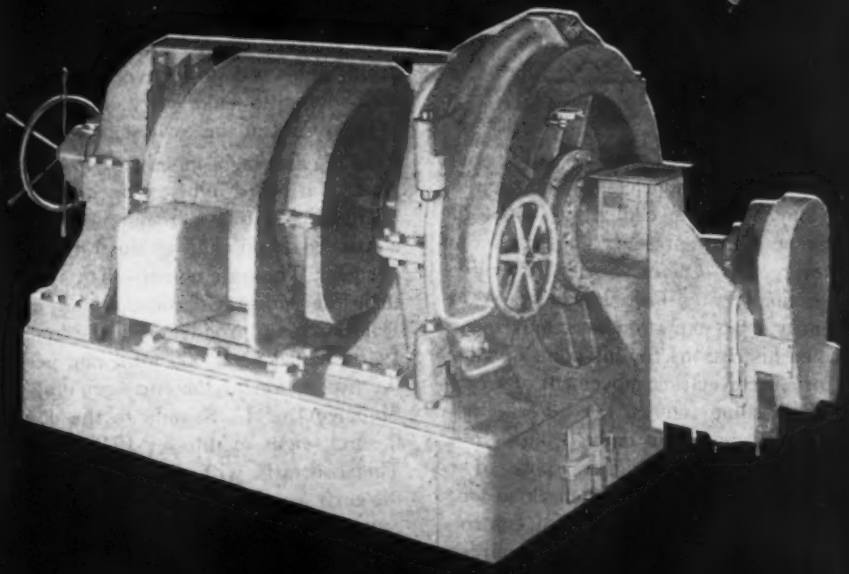
R. Paradis, formerly chemist, Pacific Mills Ltd., Vancouver, B. C., is now attending the Graduate School of Chemistry, University of Washington, Seattle.

Mr. William W. Bolton, President of John W. Bolton & Sons, sustaining member of the Technical Association, passed away September 10th at Lawrence, Mass.

The following are visiting in the United States: Mr. G. Bireben, Mendia S. A., Hernani, Spain; Etienne Perrigot, Papeteries d'Arches, Paris, France; Pierre Avot, Avot Vallee, Blendecques, France; Alexis Failliot, Papeteries de Pont Auderner, Paris, France.

J. H. McCarthy, formerly engineer for the Soundview Pulp Company, is now with the Pulp Division, St. Regis Paper Company, Tacoma, Wash.

ECONOMY THRU EFFICIENCY



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Capable of all operations from a straight defiberizing program to the actual refining of already processed fibers for fine papers, the Sprout-Waldron 36-2 Refiner is particularly well adapted to the following applications:

1. Reducing semi-chemical pulp chips in stage operation to finely divided fibrous form.
2. Reducing groundwood rejections.
3. Reducing sulphite and kraft knots and tailings.
4. Processing kraft pulp on cycle for condenser papers.
5. Professing flax pulp on cycle for cigarette papers.
6. Processing sulphite pulp on cycle for glassine and waxing papers.

SPROUT-WALDRON & CO.

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MUNCY PENNSYLVANIA

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

W. L. Cook, Editor

Pulp Prospects

It's bad, but by no means hopeless—a summary of conditions that almost anyone could give about the state of any market just at present. The speaker in this case, however, was Oliver Porter, executive director of the United States Pulp Producers Association: his authority as an expert on basic movements in the pulp market, his reasons for his point of view, his arguments for a freer market movement of woodpulp all have a compelling interest for all who rely on the paper business for their daily profits. In a recent report he covered the higher spots of a situation that holds the threat of a bottleneck so long as demand continues to rise while artificial controls discourage freedom of action at the producing sources.

Self-contained mills, he finds, should be able to meet their pulp requirements, but the outlook for many of the converting mills is very gloomy. Even those mills which had reason to believe that they were well covered, as far as their 1946 and early 1947 pulp requirements were concerned, are now finding that their foreign reservations are not materializing, and that their actual pulp supply prospects are anything but satisfactory. Over the long range, he suggests that it would be sound policy for both self-contained and converting mills, as well as for the consumers of pulp and paper, to support any practical program for the development of our forest resources. The supply of timber in this country can be protected and increased, through sustained yield management and reforestation, to the point of adequacy for any forseeable demands.

From the Swedish producers' point of view, the OPA's recent action on pulp prices were much too late to be effective in respect to the movement of pulp to this market in the first six months of this year and its September 5th increase was not enough to offset the appreciation in the value of the Swedish crown.

The Swedes naturally want to supply their customers here, but this market's frozen prices are considerably less than those of other overseas markets, all of which are pressing the Swedes for early 1947 commitments. Swedish pulp production, already limited by shortages of coal and wood, with resultant increases in unit costs, has now been burdened with a 16 per cent loss on export shipments to the USA, due to the recent appreciation in the value of the Swedish crown, in terms of the American dollar. As a consequence, there appears to be considerable evidence that, unless these conditions are changed, the 1946 volume of shipments from Sweden to this market will not be maintained in 1947.

The advances in pulp prices authorized by the OPA on September 5th were not sufficient to bring about a balance between market pulp demand and supply. This suggests the argument that the whole industry, from pulpwood to converted products, would be well-advised to make every effort to get released from price control at the earliest possible date.

In the first eight months of 1946, the United States paper and board industry operated at the record rate of 18,870,000 tons per annum. In this production it consumed wood pulp at the rate of 11,940,000 tons per year. This rate is more than a million tons higher than the industry's consumption of pulp in 1945. Domestic pulp production in the first eight months of 1946 totalled 6,927,000 tons, one per cent more than the production of the corresponding period of 1945. Shipments of U. S. pulp to the domestic market in the first eight months of 1946 totalled 856,540 tons. This contrasts with shipments of 1,013,020 tons in the corresponding period of 1945, a decline of 15 per cent. Sales of domestic pulp during 1946 have been nine per cent more than those which were freely offered for sale during the first eight months of last year, the loss of "withheld" tonnage, under WPB allocation, having been made up by imports from Europe.

Estimates published early in 1946 indicated probable imports from Sweden this year of from 700,000 to 800,000 tons. Current estimates indicate that this volume will not exceed 500,000 tons, and might even be less in 1947.

Total imports of wood pulp from Canada, including shipments from U. S. owned or affiliated companies in Canada, have been 805,937 tons, during the first eight months of 1946, as contrasted with 705,150 tons in the corresponding period of 1945. The recent adjustment in wood pulp prices should tend to maintain the flow of Canadian exports to the United States at about the current level.

Total 1946 consumption of market pulp is now estimated at 2,950,000 tons, with a consequent loss in inventories of 200,000 tons during 1946. It is thus quite evident that the industry as a whole, and par-

Calendar of Coming Events

October 14-16, 1946—TAPPI Alkaline Pulping Meeting, Roosevelt Hotel, New Orleans, La.

October 17-19, 1946—National Paper Trade Association, Fall Convention, Edgewater Beach Hotel, Chicago, Ill.

ticularly its converting segment, has been operating beyond its fibre supply. It has been "living off the fat" of its accumulated pulp inventories, without reasonable assurance or, as it now appears, of even good prospects of their replacement.

More Trees

It is fitting that the pulp and paper industry give some of its attention to the meeting, over the week-end, to the annual meeting in Washington of trustees of the American Forest Products Industries, Inc. The ever-insistent demand for paper and more paper puts pressure on a more basic requirement for pulp and more pulp. The only answer to this call is to be found in trees and more trees, whether they be grown north, south or west, or overseas. To be sure, there are vast areas of the earth still liberally supplied with forests, but reliance on them must be subject, at times, to such complications as interrupted communications or world economic pressures. The simplest answer, with benefit to the national wealth, lies close at hand, in the soil of tracts still unproductive after their first use, or in the areas still producing to a wasteful method of cutting. Grow more trees and harvest them wisely.

While the industry will read with freshened interest the reports of progress that have been made in the past year, as they are presented to the Washington meeting, it has a comforting preview of the high spot of the year to fix its interest on the future of pulp in this country. In a ceremony last month in Ohio, attending the award of certificates to sponsors of tree farms in Ohio, an official of the Forestry group recited that more than a million acres have been added to the nation's tree-growing tracts in the past year, and totals more than 12 million acres.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1946		Corresponding Weeks—1945	
August 24	106.1	August 25	95.4
August 31	105.6	September 1	95.2
September 7	86.7	September 8	75.9
September 14	105.1	September 15	94.0
September 21	105.8	September 22	94.3
September 28	*106.6*	September 29	98.1

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1945	86.7	89.4	90.2	88.1	89.8	91.2	80.8	88.6	90.2	95.9	95.5	91.0	89.7
1946	94.7	98.4	104.4	102.7	100.7	104.6	94.0	104.7	*101.3*				

COMPARATIVE YEARLY SUMMARIES

	1939	1940	1941	1942	1943	1944	1945	1946
Year to Date	79.8	86.2	95.2	92.1	88.2	87.9	88.2	*100.2*
Year Average	83.4	85.6	97.4	90.4	87.8	88.1	89.7	

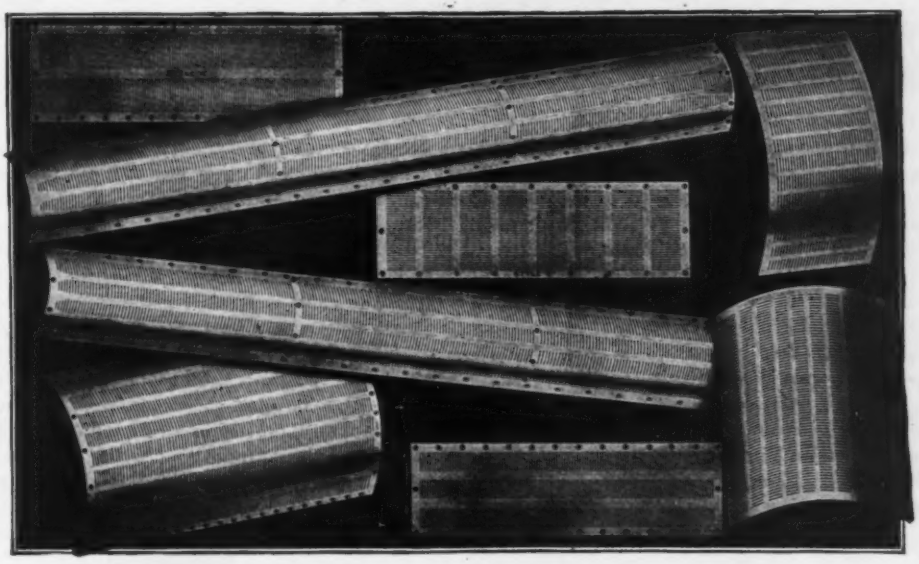
* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Current Weeks—1946		Corresponding Weeks—1945	
August 24	100	August 25	99
August 31	100	September 1	97
September 7	83	September 8	80
September 14	101	September 15	96
September 21	100	September 22	93
September 28	*101*	September 29	96

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1945	91	95	97	97	96	96	86	90	91	97	95	85	93
1946	90	97	100	99	94	97	89	99	*96*				

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.



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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Thrift Versus Drift In Forest Practice*

By Reuben B. Robertson*

President of the American Paper & Pulp Association

I have been a member of TAPPI from the first year of its organization and have had the privilege of intimate association with many of your members. I know that you have made real contribution towards the development of the industry along more scientific and more efficient lines.

My own work has been more in the administrative segment of the industry, than in the technical segment, and that has kept me several substantial layers below the intellectual stratosphere in which scientists work.

My comments will of necessity be confined to the informational strata with which I have some degree of familiarity.

I do not propose to belabor you with an array of statistical data because after a hearty dinner, I am sure some of my audience would shortly be snoring in my face and furthermore some of my precision minded friends in the audience would probably question the accuracy of my data anyway.

My first contact with papermakers was back in 1906 when the idea prevailed that pulp and papermaking were arts and could not be reduced to the sharply defined rules of science. The sulphite cook, for instance, in those days relied on much of the hocus pocus of the alchemist. His technique was deep and dark, and capable of being fathomed only by fellow alchemists like himself.

The fellow who attempted to determine the right procedure by chemical tests earned his indignation and contempt.

One sulphite mill I visited back in 1907, made its acid in a rotating cylindrical contraption of wood, about 25 feet long and 4 feet in diameter, designed to receive milk of lime at one end with SO_2 gas entering and moving counter current to the lime from the other end.

The reaction naturally raised the temperature of the finished solution. The acid maker, with an expression of intellectual superiority would determine the quality of the acid by inserting his finger in it. If the solution was hot, it was good, if it was cool, it was useless. There was not a piece of equipment in the mill by which a titration could be accomplished, and yet pulp was made which was converted into saleable paper.

The operator with crude equipment and no training had to be a close observer.

Some of you may recall the tale that was told of Oliver Wendell Holmes. He was emphasizing to the class of students the importance of close attention and careful observation. He produced a vile smelling solution in a tube, put his finger in it, put his finger in his mouth and then passed the tube around for the students to taste. They completed the tasting operation with wry faces and considerable grumbling. Then Dr. Holmes remarked "I told you to observe closely and if you had done so, you would have noticed that the finger I put in my mouth was not the finger I put in the solution". The importance of care in such matters was emphasized also in the old epitaph which read:

"Alas poor Jones is dead
We see his face no more
For what he thought was H_2O
Was really H_2SO_4".

Jealousies, inferiority complexes, snobberies, enter into every aspect of human endeavor.

Possibly a result of such feelings, there has been in the paper and pulp industry an ancient fued between the so-called technical and the so-called practical man. Up to quite recently the practical man has held full sway in the operations of cutting, gathering, and transporting of pulpwood. Actually there should be no conflict of thought between the two groups. With a degree of understanding and sympathy, each can make worth while contribution to the work of the other.

It has been my privilege to serve as one of the trustees of the committee for economic development, and to witness in their meetings one of the finest examples of the coordination of the efforts of the scientist and the practical business man that this country has ever witnessed.

Careful studies initially prepared by the scientists are subjected to dispassionate and objective analysis, in round table discussion, with scientist and business men participating, and with all earnestly seeking the

* Presented at the fall meeting of the Technical Association of the Pulp and Paper Industry, Hotel Statler, Detroit, Mich., September 26, 1946.

one best solution of the problem being considered. Out of such discussions came the very valuable pamphlets which have been so universally accepted as guides for post war economic policies.

Such an application of the principles of good team work is helping to solve problems of the paper industry and I believe will have increasing value in the future.

Until quite recently most pulp mills, surrounded by an abundance of suitable timber were inclined to get their pulp wood supplies in the simplest way possible, in the way that meant fewest headaches for management. In general, that meant that supplies were obtained by open market purchase of wood, delivered by a contractor on cars, with only residual needs taken care of through operations on company owned lands. The purchasing was not required to, and did not, give much attention to extent of utilization of potential forest resources that prevailed.

Today with steadily diminishing stands of timber and steadily increasing price competition from other needed forest products, users are properly becoming increasingly cost and method conscious.

Pulp mill operators are beginning to appreciate in greater degree the sometimes forgotten fact that they have important enemies in the competition for timber, in the *nonusers* as well as the *users*. Forest fire and decay are in this sense competing nonuser. No good comes from their ravages of forest.

Abundant emphasis has been given over the years to the losses which result from forest fires. Progress in prevention is being made and little comment need be made here on that score.

I am confident, however, that pulp wood users generally do not fully appreciate *how much* of the potential supply of forest products is lost through the nonproductive processes of decay.

It is well known that thrifty cutting of the forest must be *timed* cutting.

We lose in productive capacity, if we cut excessively in an immature forest. Our losses are correspondingly great if we defer cutting in a mature forest too long and so allow annual decay to exceed annual growth. Like field crops, the forest have their time when they are ripe for harvest and there is an economy of *timeliness*.

We laymen have not fully appreciated that the young thrifty forest which is steadily increasing its inventory of growing stock, still presents a decay problem of considerable importance.

Foresters tell me that in pine forests where the stand is fully stocked in natural reproduction, it is not at all unusual to have 2,000 stems to the acre and in many instances there are 3,000 stems per acre. From such stands they tell me that only 500 stems per acre will ever be harvested, if pulpwood is the objective, and only 100 stems per acre if saw logs are the objective.

In good years, nature plants with a lavish hand and provides a bountiful factor of safety for ultimate survival of the forest. Decay accounts for the lost 1500 stems per acre that have disappeared between the youth and maturity of the forest stand.

The growing forest like a litter of pigs has its "runts" of low vitality as well as its individuals of high vitality. They seldom reach equal strength because the stronger pushes the weaker aside at feeding time and the latter fails to get even his proportionate part of the food supply, and unless artificial aids are provided the runts wither and die.

Occasionally it has been found practical to conduct thinning operations before decay of the "runts" has taken its toll, but such instances for the exception rather than the rule. Pulp mill operators generally, have in the past, made little use of this potential resource, because of practical considerations of costs and methods. Few folks will use skimmed milk when whole milk or cream are available in abundant supply.

Obviously, it will cost more in labor to cut, log, load, and transport from the woods a multitude of small sticks than it will to apply these same processes to half the lumber of larger pieces, at least as long as conventional methods are used. Furthermore the penalties for handling a multitude of small sticks are not confined to the operations in the woods, but extend throughout the processes of unloading storing, barking and chipping at the wood room of the pulp mill. It is evident that for adequate utilization of this small timber, new methods and new techniques will be required all the way down the line. New competitions for timber volume, due to the war and to governmental regulations designed to encourage greatest production of the materials for which the greatest need exists, have changed relative stumpage values and relative labor costs as well.

Stumpage that is noncompetitive with any established demand, should be considered as a potential raw material supply even though the cost of getting it out is higher than the operator is normally accustomed to. Low stumpage value can at least in some degree, neutralize higher labor cost.

As in other commercial activities, there is an optimum balance and a practical dividing line between increased labor cost and decreased material cost and the placement of that line will vary from time to time and between localities.

That line, however, can be pushed much further toward more competitive utilization if new and more scientifically designed methods can be devised to meet changed conditions.

To handle sticks as small as 2 inches in diameter, tree length, or log length transportation, mechanical loading, and special truck and railroad car bodies, all warrant careful study.

At present, excessive losses occur in removing the bark in the barking drums, because of wide spacing of the channels in the drums, as usually installed.

Experiments with narrow spacing of channels are being made with rather promising results. However, with improved methods of freeing the liquid pulp from fragments of bark and similar impurities through better screening, better riffling, better bleaching, etc., many more liberties can be taken with the initial wood preparation than was formerly the case. Experimental runs also indicate that substantial percentages of thin-barked, small diameter pulp wood can be satisfactorily used without any bark removal whatever.

I believe the pulp manufacturer of the future is going to have to content himself with increasing percentages of the "crumbs" from the forest table instead of the full loaf and furthermore that he will learn to like it.

He will have to use the research technician and the technically trained operator to a far greater extent than ever before. He will have to adjust himself to the scattering of his wood gathering activities over a far larger acreage than has been customary in the past, because the percentage of total stand allocated to him by the new economic balances is likely to be far less than in earlier years.

In exploiting our natural resources, we have been prone to rely on a marriage of resource and *brawn* with resultant relatively low wage and low living standard for the workers. In the future, we will rely to a greater extent on the marriage of resource and *brain*. In that way we will probably attract operators of higher skill and can afford higher living standards.

Those, who, some years ago, confidently assured the investing public that pine pulp wood could be delivered at the Southern mills for generations to come at prices ranging from $3.50 to $5.00 per cord, performed a disservice to the South.

It never was, and never could be possible to make deliveries at such prices, without anchoring to substandard living conditions, I sincerely hope that such prices, and the talk of such prices, have gone never to return.

Over emphasis on low costs and on rapidity of growth have resulted in bringing into the South more pulp wood consumers than it is now ready to support on a sustained yield basis.

As one travels over the forested areas by private or commercial plane, one is impressed with the apparently limitless scope of the forests.

Closer examination from the ground, a study of ownership, and an investigation of stumpage prices, should remind the prospective pulp wood user that "all is not gold that glitters" and hat there is often a vast difference between what seems to be, and what is actually, available for use.

Protection against over development of wood using industries in given areas, is something greatly needed not only for those already established, but also for those who plan to build. As so often happens, it is far easier to prove the need than to provide the remedy. We do not want to "throw out the baby with the bath", and sacrifice sound principle in favor of temporary expediency.

We hope that correction will come through broad dissemination of accurate information about vital factors of growth and drain and the exercise of greater care on the part of prospective builders of mills, themselves, to make sure that they really have available what they think they have. We hope it will not be necessary to resort to such drastic moves as state licensing for new enterprises or the far more bitter pill of federal control.

The South eventually can produce through forest management much more pulpwood than it now produces but its forests need a rest from over exploitation. Fire protection, forest management fuller utilization, fine as they are, cannot make their beneficial influences retroactive. We are at present dealing with potentialities rather than the realities of forest wealth.

Many of you here tonight are not in direct contact with the specific problems of forestry. I know that there are many challenging problems in the numerous other fields of scientific study which touch on paper making, but I am advised that the meetings of the present session have been designed to give especial emphasis to forest problems. In the time allotted me, I have accordingly devoted most of my suggestions to a few phases of the forest problem. Obviously, I have been unable to touch on many topics that are under active discussion, such as utilization of logging wastes, the place of hardwoods in a balanced pulp making program, and many similar topics.

No matter what field of activity absorbs our work-a-day interest, we cannot escape the impact of forces unleashed by the war. We can no longer expect to be entirely free from the penalties of inflation. The disease is already established and in my opinion it is now only a question of "how much" and "how long". We are already dealing with fictitious dollars.

Some of you may recall the story of the boy who came home with a mongrel pup and his father asked "wherever did you pick up that animal?". "I bought him" replied the boy and "how much did you pay for him"? "$100,000" "and where did you raise the $100,000"? "Ah, I sold two $45,000 cats and a broken knife".

When they witness the ever present inflationary trends, the uncontrolled and wilful power of organized labor, the economic confusion occasioned by political incompetency, some of my friends are prone to say "Oh, what's the use"? "There's a storm coming, let's just batten down the hatches and ride it out". This is a very natural reaction of an individual to cumulative forces beyond his control, but its a reaction that is more likely to aggravate than to alleviate the troubles of the day. Its the attitude of defeatism.

Most of us recognize, I believe, that the communist cook has his spoon in many of the economic pots that are boiling today and that he seeks every opportunity to make them boil over.

By "battening down our hatches" and "riding out the storm", we would be doing the very thing the communist would like to have us do. They thrive on confusion and chaotic inertia, are ready and eager to take full advantage of every such situation.

Private enterprise and the American way of life are at stake in a far more serious way than the average Joe Doak realizes. Only a militantly vigorous and constructive policy carried out by every business man will guard us against the ugly head of communism.

A friend of mine tells of a fine and powerful horse who roamed his pature in health and strength in complete defiance and disdain of a flock of vultures who hovered overhead. There was nothing they could do to him and he could well afford to ignore them. One day, however, the horse became entangled in the quick sands which occupied a corner of the pasture and was quickly in a condition of complete helplessness, his most violent struggles were of no avail. Then the vultures descended on him in safety and proceeded to pick out his eyes, his brain and his vitals. We cannot, for a moment, forget that we have far too many social and economic vultures hovering about, ready to descend and destroy, when their intended victim is helpless.

Success in all work in the business and professional field is always a source of personal satisfaction. Today the success of every constructive enterprise is not only a satisfaction but it is a social duty. Success should be not an end in itself, but a means to an end.

It is only by successful operation that an industry can carry the increasingly heavy burdens of social security of higher standards of living which we all so earnestly desire. More and more the technically trained man must be relied on to carry the ball. TAPPI and its members will have an ever broadening field of usefulness before them. They should help us to avoid the drift of outmoded habit and develop the thrift of betterment and of invention.

One writer has given the following outline of the essentials of a program leading to success:

"A successful company is built alike of tradition and invention, caution and experiment, conservatism and change. It blazes trails for the future and orients them by the pole star of the past. Its methods are flexible, but its principles are adamant".

Turbine Installation and Maintenance*

By Hans P. Dahlstrand[1]

Abstract

The paper describes various types of steam turbines condensing, noncondensing, condensing bleeder, and non-condensing bleeder. These types of steam turbines are generally used in the power plants of industrial concerns requiring steam for heating and process work as well as generation of power. It covers a detail description of certain vital parts of the steam turbine. The regulating and control mechanism is treated in detail to give a clear picture of the performance of these vital elements. The use of higher pressure and temperature steam in present power plants by installing high back pressure units is briefly covered. An approximate method for estimating the performance of the different types of units is also shown by diagrams. From these diagrams an estimate may be made of the economies and the size unit required. The importance of maintaining the steam turbine in good operating condition is stressed as only in this way can the maximum reliability and efficiency be obtained. Definite methods for the guidance of the operating engineer is indicated. These methods consist of a continuous record during operation of all conditions existing in the power plant. Thorough inspection of the steam turbine should be made periodically and these inspections should cover all parts likely to require attention. Suggested rules are given covering this inspection as well as precautions to be used in reassembling the unit together with keeping a complete record of the condition as this record will be of value at subsequent inspections.

A number of different types of steam turbines have been developed since the first commercial unit was put into operation. Each of these types of steam turbines fits into some certain specific condition existing in an old power plant or in a new power plant, and type chosen depends on the service the turbine is to perform. In new power plants where the purpose is to generate power only, the straight condensing turbine is used. These units are in all cases operating on the regenerative cycle or in some specific cases on the reheat and regenerative cycles. In the regenerative cycle the condensate or boiler feed water is preheated with steam bled from the turbine at various stages before entering the boiler. In the reheat cycle the steam is reheated after passing through part of the steam turbine and after the reheating is passed back into the last section of the turbine. Both these cycles materially increase the thermal efficiency of the power plant. The reheat cycle, because of the complications and cost covering the installation, is used only in large public utility power plants. The regenerative cycle is applied practically to all installations, public utilities as well as industrial installations.

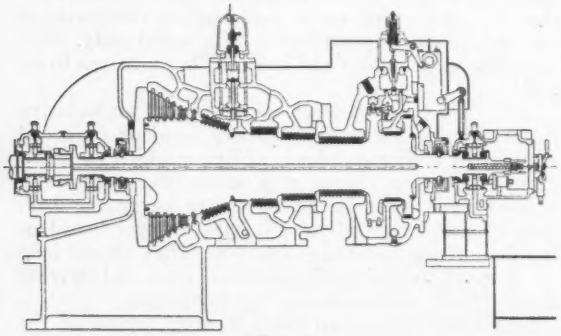

FIG. 1
Section Through a Condensing Automatic Extraction Impulse Reaction Steam Turbine

It is proposed to discuss the various types of steam turbines used in industrial power plants. It is realized that all the special conditions may not be covered, but, nevertheless, with a complete description of the functions of the various types, practically any special condition would be covered. In selecting the type of unit for a specific installation it is well to consider any future changes in conditions that may be necessary so that the equipment selected will maintain its efficiency in operation during its life. The requirements in an industrial power plant are power for the operation of the plant and steam for certain processes. In selecting the equipment for these plants it is vital that the power requirements and the steam requirement is coordinated in such a manner that the two balance each other. This is not always possible and for that reason the turbine equipment selected should be such that a minimum amount of steam could be condensed in order to obtain a maximum efficiency in the plant. The steam turbine types generally selected for different operations consists of:

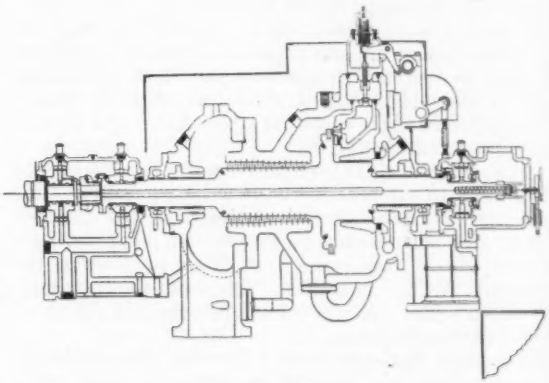

FIG. 2
Section through a Noncondensing Impulse-Reaction Steam Turbine

1. Straight condensing units where the high pressure steam passes through the turbine into the condenser without any automatic bleeding of the steam. These types of units are practically always provided with openings so that steam may be bled for feed water heating.

2. Condensing bleeder turbines where the steam is bled at a constant pressure and at one or more points to furnish steam for various purposes and the balance of the steam condensed in the condenser. Additional bleeder points for heating the feed water may be pro-

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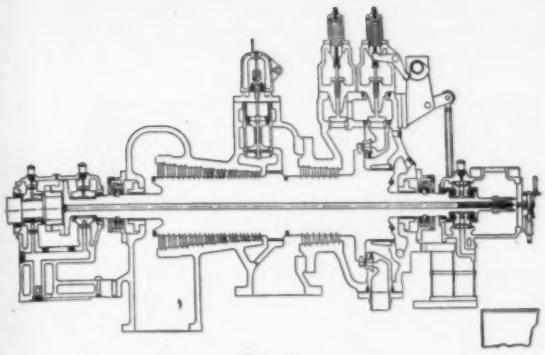

FIG. 3
Section through a Noncondensing Automatic Extraction Impulse-Reaction Steam Turbine

vided if found desirable. The pressure in this case will vary with the load and the amount of steam bled at the constant pressure bleeder points.

3. Noncondensing back pressure turbines where all the steam entering the inlet is exhausted at a certain definite pressure and the steam used either for low pressure turbines or process work.

4. Noncondensing bleeder turbines where steam is bled at one or more points at constant pressure. The exhaust steam in this case is used for heating or process work.

5. Mixed pressure turbines where the steam is admitted to the turbine at more than one pressure.

With one of more of these types of units, practically every condition for the economical operation of an industrial power plant can be met. The proper choice of equipment for the plant depends upon a thorough understanding of the conditions and also upon a thorough knowledge of the characteristics and limitation of each different installation.

Types of Turbines

The straight condensing type of unit as mentioned in (1), is used in a plant only where the power requirements are great in comparison with the process steam requirement and then generally in combination with a noncondensing or a noncondensing bleeder unit. If it is an old condensing unit installation with comparatively low steam pressure and when new equipment is required, a noncondensing unit with higher pressures can be installed which will furnish the steam for this low pressure unit. This noncondensing unit is called a "topping" unit and has been installed in a large number, both public utilities and industrial power plants.

The automatic extraction condensing unit (2), has been used widely in industrial power plants and is shown in Fig. 1. This design shown has only one bleeder point where the pressure is controlled automatically. Steam for heating the feed water is bled at two points. The pressure at the automatic bleeder point depends upon the use for which this steam is intended. This steam may be used for heating or certain processes or sometimes is used for driving other equipment such as a steam engine driving a paper mill or an engine driving a compressor or other axial equipment. In these cases the turbine installations makes use of high initial pressure and temperature and uses bled steam at a pressure and temperature for which this equipment is suitable. There have been built a number of steam turbines where the steam has been extracted at two pressures with automatic control. The control, however, is more complicated and the turbine is designed for specific conditions; therefore, it should be realized that if these conditions vary materially, considerable loss in efficiency will be the result. Careful investigation should therefore be made and all conditions should be checked before considering the installation of a double bleeder automatic steam turbine.

The noncondensing turbine (3) as mentioned previously, has been installed as a "topping" unit where the steam from this unit is used for operating lower pressure units in the plant or where steam is required for process work at this higher pressure and temperature. (See Fig. 2).

A noncondensing bleeder turbine (4) represents a design that has been used where steam at two different pressures is required for processes or other purposes. In plants where the steam requirements are equal or exceed the power generated from this steam, this design has proven to be very economical. The condenser with its auxiliaries requires quite some power in operation and represents a considerable investment and maintenance. It is therefore very important for the best economy to check before installing a condensing bleeder turbine whether the steam requirements are such that it will be more economical to use a noncondensing bleeder even if at some time some small amount of steam has to be exhausted to the atmosphere. As mentioned before, it is important to use initial pressures and temperatures that will give the highest possible efficiency and as additional steam is required, it can be taken directly from the boiler using necessary pressure reducing and desuperheating equipment. When operated without being in parallel with other generator equipment, the

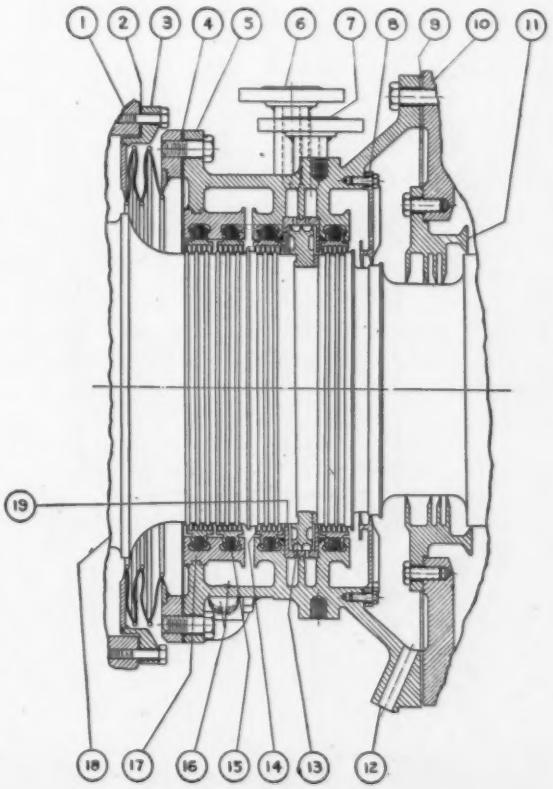

FIG. 4

steam flow can be controlled automatically either at the extraction point or at the exhaust. If operated in parallel with other equipment, the steam flow may be controlled at both points, the load then varying with the steam requirements. (See Fig. 3).

Mixed pressure condensing unit (5) where steam at two or more different pressures enters the turbine are used in some special cases, it should be realized that these units are special and that if conditions change materially, there will be a considerable loss in efficiency. In some cases these units are also used either as a mixed pressure or automatic extraction unit.

Sealing Glands

A typical high back pressure impulse reaction type turbine as shown in Fig. 2, the turbine details are in many respects similar to those used on high pressure condensing units. There are, however, several necessary differences in some details such as sealing glands and steam control equipment. Because of the high back pressure, the glands must be made so that there will be no excessive leakage of steam with a resultant loss in efficiency. The gland shown in Fig. 4 is a combination labyrinth and water seal type. The labyrinth seal consists of several rows of radial type packing each having six sealing edges. The rows of packing are made up in short segments and are held in a radial position by coil springs mounted between the gland casing and the segments. The clearance between the shaft and the sealing strips is maintained at a minimum. In case the shaft touches the sealing

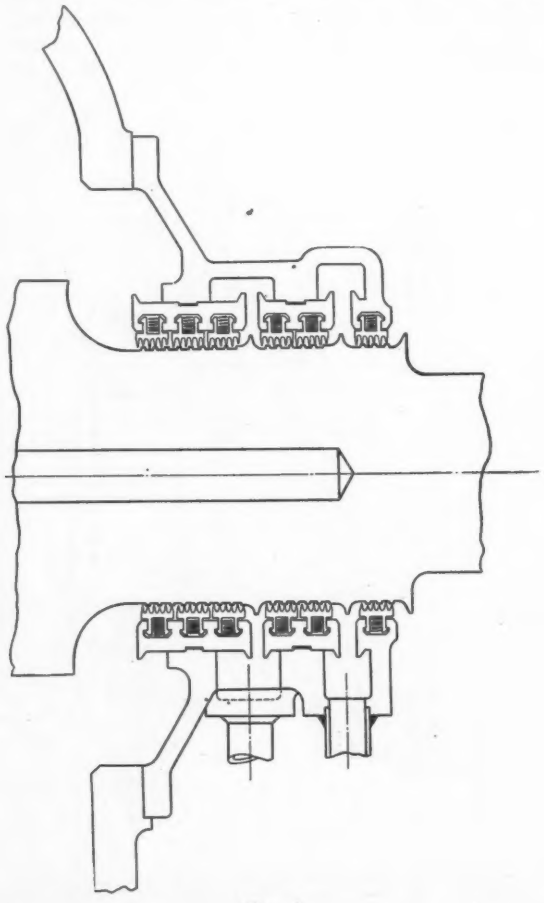

Fig. 5

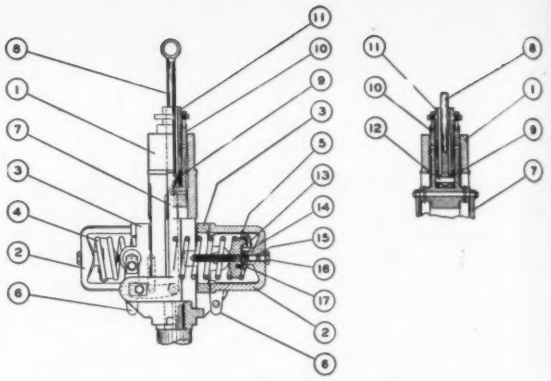

Fig. 6

Spring Type Speed Governor. 1—Frame. 2—Bridge. 3—Weights. 4—Spring. 5—Spring Yoke. 6—Lever Yoke Assembly. 7—Lever (Connecting Link). 8—Governor Stem. 9—Connection Ring. 10—Cross-Head. 11—Cross-Head Sleeve. 12—Pin. 13—Spring Clamp. 14—Lock Plate. 15—Pin. 16—Spring Bolt. 17—Lock Screw.

edges, the segments will move away from the shaft compressing the springs. The water seal gland consists of a casing with a space for a runner mounted on the turbine shaft. On each side of the runner space, labyrinth seals of the type described, are mounted to prevent an excessive amount of water from passing out between the turbine shaft and the labyrinth seal. Between the labyrinth seal and the water seal there is a leakoff connected to a lower pressure. This leakoff is required as the water seal gland can seal only against a limited pressure. The steam from this leakoff can be connected into some source where a low steam pressure exists.

Sealing water is admitted to the gland through the circulation water inlet. To keep the temperature of the water in the gland below steaming temperature, a small amount of water is circulated through the gland and drawn off through the circulating water outlet. To control the flow of water there are control valves in the inlet and outlet water lines.

Figure 5 shows a labyrinth sealing gland having no water seal. The labyrinth seals of this gland is of the same construction as those used in the above described water seal gland. In this type of gland there are two leakoffs. One leakoff nearest to the inside of the turbine cylinder is connected to a low pressure steam system at about atmosphere or slightly above. The outer leakoff is connected to the outside atmosphere. It is necessary to provide some means to reduce the pressure at this leakoff slightly below atmosphere in order to prevent any steam leaking out between the gland and the bearing pedestal. The means for creating this vacuum usually is a fan, a water ejector, or a small condenser.

Governors

When the high back pressure turbine operates in parallel with other turbines and the steam requirement from this turbine has to be controlled this control is through the means of a pressure regulator actuating the steam inlet valves of the back pressure turbine. In this operation the exhaust pressure is maintained practically constant during operation. Any changes in the steam requirement will of course change the load on the back pressure turbine and these changes will be automatically taken care of by the units operating in parallel; in other words, the steam flow to the high back pressure turbine is controlled by a pressure governor and the speed governors on the other units. These governors operate in

the following manner: As the load of the system increases, the speed will drop slightly and the speed governor will open the steam inlet valves to the turbines. If any of the other units of the system uses steam from the high back pressure turbine exhaust, the increasing load will cause a slight drop in this back pressure. The pressure governor on the high back pressure turbines will then open the inlet valves on this unit and balance the load between the turbines on the system. If the load drops, the reverse of the operation takes place.

The high back pressure units are of course provided with a speed governor as well as a pressure governor in order to prevent the units from overspeeding if they get out of parallel with the other units.

The speed governor shown in Fig. 6 is the usual centrifugal type and arrange with two weights (3) held in position by a spring (4). A lever connection from the weights transmits the movement of the weights to the crosshead. Governor stem (8) connects the crosshead to the governor levers and the other end of the levers is connected to the relay valve. The governor spring by means of yokes (5) can be adjusted to change the sensitiveness of the governor, permitting an adjustment in speed variations for changes in load that will correspond to the sensitiveness of governors on units operating in parallel. The screw adjustments at the ends of the spring allows the tension of the spring to be adjusted so that the centrifugal force from the weights will balance the spring force at a certain definite speed of the governor. The governor is driven from the main turbine shaft through worm gears. In operation, with an increase in turbine speed, the governor weights move out until their certifugal force is balanced by governor spring tension. As the weights move out the lever connection will lift the crosshead with the governor stem. For decrease in speed, the reverse of the above action will occur.

Pressure Regulator

The pressure regulator shown in Fig. 7 consists of three main parts: the sylphon bellows with its supporting spring, the relay valve, and the operating piston. In operation the sylphon bellows translate any change in the exhaust steam pressure into motion of the bellows which in turn is transmitted to the relay valve. Any change in the relay valve opening changes the oil pressure on either side of the piston causing the piston to move, which movement in turn is transmitted to the relay valve on the power piston. A pipe from the exhaust of the turbine is connected to the bellows housing (71). The sylphon base (72) is fastened to lower end of sylphon bellows (69). The lower spring seat (66) is also fastened to the sylphon base. Rod (62) connects lower spring seat (66) with lever (32). The other end of this lever is connected through rod (38) to valve rod (39). Mounted on rod (38) is a light spring (34) one end of which rests on spring seat (35). This spring seat is mounted on lever (10) which through link (13) is connected to rod head (60). The rod head in turn is connected to piston (65). Rod head (60) through levers and links is connected to the relay valve on the power cylinder. Oil under pressure is admitted to the pilot valve through pipe opening (25).

During operation when pressure in the turbine exhaust increases the sylphon bellows and spring (61) will compress. This in turn will move rod (61) which through lever (32) opens valve (39) letting oil enter the space on top of piston (65) and the same time connect space below piston to oil drain outlet (21). The piston will then move downward and through connections from rod head (60) will operate the relay controlling the operation of the power cylinder piston. When piston (65) moves upward spring (34) will be compressed through lever connection to the piston. This will force the sylphon bellows back into its original position and at the same time restore valve (39) into its closed position. When the pressure in the turbine exhaust decreases, the reverse of this operation takes place. The turbine exhaust pressure may be changed by operating the worm gear (57) through handwheel (74). By turning the handwheel the spring (61) can be compressed or released changing the pressure required for the operation of the regulator. Connected to piston (65) is dash pot piston (3) which prevents hunting of the regulator.

Steam Admission Valves

The power piston Fig. 8 furnishes the necessary power for opening and closing the steam admission valves. Mounted on the side of the power cylinder (1) is the relay valve (10) which controls the oil flow on either side of the piston (3). This relay valve consists of a small pilot valve (11) mounted inside the relay valve (10). The pilot valve is connected to the speed and pressure regulator from connection

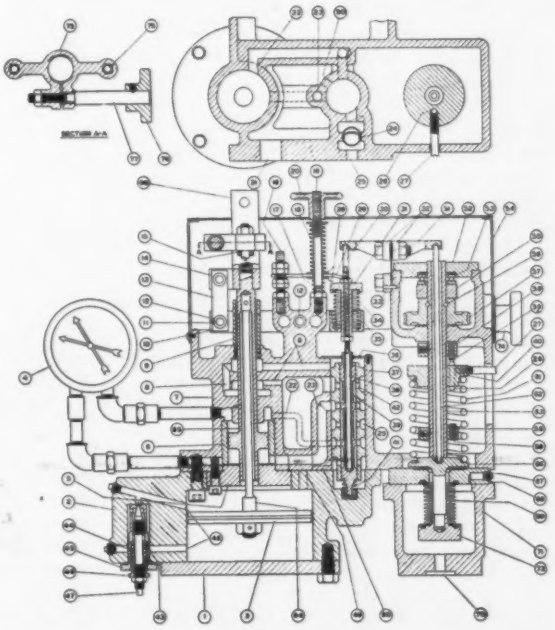

Fig. 7

Pressure Regulator. 1—Cover. 2—Regulator Cover. 3—Piston. 4—Duplex Gage. 5—Dash Pot Cover. 6—Bushing. 7—Regulator Body. 8—Drain. 9—Stop. 10—Lever. 11—Bolt. 12—Bearing. 13—Link. 14—Rod End. 15—Spacer. 16—Bar (Stud). 17—Spring. 18—Spring. 19—Bar (Stud). 20—Handwheel. 21—Oil Drain Outlet. 22—Oil Inlet Above Power Piston. 23—Oil Inlet Below Power Piston. 24—Strainer. 25—Oil Inlet to Pilot Valve. 26—Bar. 27—Tap Bolt. 28—Washer. 29—Disengaging Lever. 30—Special Rod. 31—Spring Seat. 32—Rocker Arm (Lever). 33—Spring Clamp. 34—Spring. 35—Spring Seat. 36—Split Cover. 37—Relay Valve Bushing. 38—Special Rod. 39—Valve Rod. 40—Upper Spring Seat. 41—Spring. 42—Drain. 43—Gland Washer. 44—Packing. 45—Needle Valve Body. 46—Gland Screw. 47—Valve Stem. 48—Dash Pot Circulating Duct. 49—Air Vent. 50—Drain. 51—Fulcrum Spring. 52—Cover Plate. 53—Ball Thrust Bearing. 54—Lagging Cover. 55—Collar. 56—Taper Dowel. 57—Worm Wheel. 58—Stop Collar. 59—Pin. 60—Rod Head. 61—Spring. 62—Rod. 63—Adjusting Screw. 64—Dash Pot Rod. 65—Piston. 66—Lower Spring Seat. 67—Air Vent. 68—Sylphon Base. 69—Sylphon Bellows. 70—Steam Connection. 71—Bellows Housing. 72—Sylphon Base. 73—Locking Clamp. 74—Handwheel and Worm Gear Assembly. 75—Stud. 76—Handwheel. 77—Shaft.

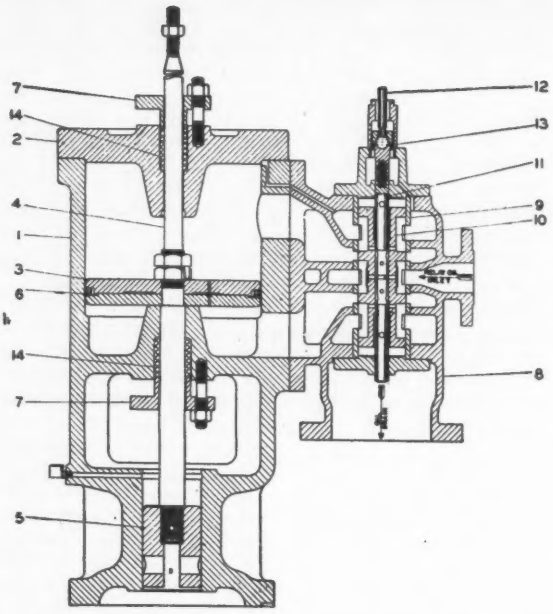

FIG. 8

1—Relay Cylinder. 2—Cover. 3—Piston. 4—Piston Rod. 5—Rod End. 6—Double Seal Packing Ring. 7—Gland. 8—Relay Valve Body. 9—Relay Valve Bushing. 10—Relay Valve. 11—Valve Rod. 12—Connecting Rod. 13—Ball Joint Halves. 14—Gland Packing.

rod (12) by suitable linkage. In operation oil from the governor oil system enters the relay valve through the relay oil inlet. If the relay valve is in neutral position there is no flow of oil. If the relay valve rod (12) moves up oil flows through the balancing holes in the relay valve and through the drilled parts in the relay valve rod to the space below relay valve. The space above relay valve (10) is connected to the oil drain so that the relay valve will move with the pilot valve. This movement will open the relay valve port connected to the space on top of piston (3) and at the same time open relay valve port connected to space below piston to the oil discharge. This makes the piston move downwards and through connection from rod end (5) will operate the steam inlet valves. A connection from piston rod (4) to levers for operating rod (12), relay valve is restored to neutral position. Relay valve ports are made without lag. Any movement of the relay valve rod results in immediate movement of the relay cylinder piston.

The component parts of the governor gear are connected by suitable linkage controlling either the speed by the speed governor or the exhaust pressure by the pressure regulator. When the pressure regulator is out of service, the governor gear functions as a standard speed regulating governor gear and the quantity of load carried determines the amount of steam exhausted. When the pressure regulator is in service, the governor gear will function to regulate the steam to the turbine in accordance with exhaust steam demands. Consequently, no regulation of speed can be accomplished and it is necessary to operate the steam turbine generating unit in parallel with some other source of power.

The problem of adopting higher pressures and temperatures in industrial plants is generally quite different from that in central power plants. This difference is mainly because of the requirements of process steam in combination with power. So for example, steam may be used for heating and process work with varying pressures and temperatures. For that reason it may be necessary to install either high back pressure turbines, bleeder turbines, or both. Other consideration may also influence the type of installation. It is of course vitally important that the maximum economy is obtained. Due consideration should also be given to future changes which may take place. It is realized of course that it is difficult to predict what these changes may be as new processes are being developed from time to time but as previously stated, the equipment installed should be such that even material changes in the processes should not materially effect the overall efficiency of the installation.

Steam Requirements

Having discussed some few important mechanical features on the above steam turbines it might be well to give some details covering the methods used for estimating the steam requirements for the various types of units.

The Mollier diagram shown in Fig. 9, is the most important tool we have for estimating performance on the various types of steam turbines. On the diagram which is shown, various types of expansion lines indicating the changes in steam conditions as the steam expends through the various stages of the steam turbine.

Expansion line (a) shows the expansion through a straight high pressure condensing unit. The steam conditions are assumed to be 650 pounds gage steam pressure, 825° F. total temperature of steam, and 29

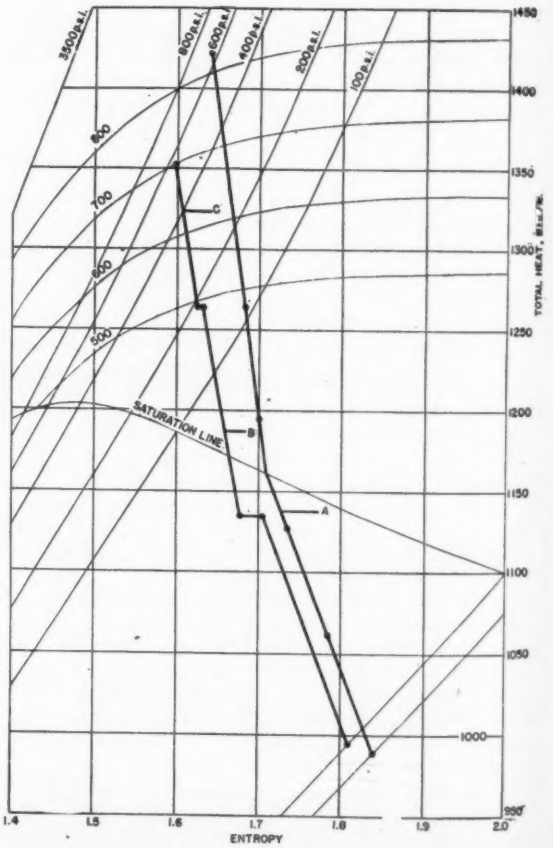

FIG. 9
Moller Diagram.

inches vacuum. The four bleeder points at which steam is bled for heating the feed water are indicated by circles.

Expansion line (b) shows the expansion through an automatic bleeder unit. The steam conditions for this unit are assumed to be 165 pounds gage steam pressure, 470° F. total temperature—bleeder pressure of 25 pounds absolute and 28.5 inches vacuum. This expansion line shows a break at the bleeder point due to the fact that there is a throttling loss in the steam passing through the low pressure bleeder valve. Bleeding steam for feed water heating can be done at the automatic bleeder point as well as the two points shown in circles on the expansion line.

Expansion line (c) shows the expansion through a high back pressure unit. This back pressure turbine is furnishing steam to the bleeder turbine shown in expansion line (b). The initial steam condition to suit the low pressure steam condition is 540 pounds gage steam pressure and 750° F. total steam temperature. It is seen from this latter expansion line that by extending this line further towards higher pressure and temperature, considerable increase in the available energy may be obtained.

The diagrammatical arrangement of the installation of a new high pressure boiler with a new high back pressure steam turbine furnishing steam to two bleeder type steam turbines is shown in Fig. 10. This diagram indicates that the old boilers are used and operated together with the new installation. The steam from the old boiler before entering the bleeder turbines is mixed with the steam from the high back pressure turbine. In this installation the logical system of operation would be to carry a fixed load on the high back pressure turbine with a constant flow of steam and any changes in steam requirements for the bleeder turbines will be taken from the low pressure boilers.

To assist in the consideration of top turbine size and initial steam conditions, there are included approximate curves, Figs. 11 and 12. Figure 11 gives the approximate superheating or moisture in the exhaust for given exhaust pressure and given standard throttle conditions. This set of curves will enable the selection of the proper intitial steam condition

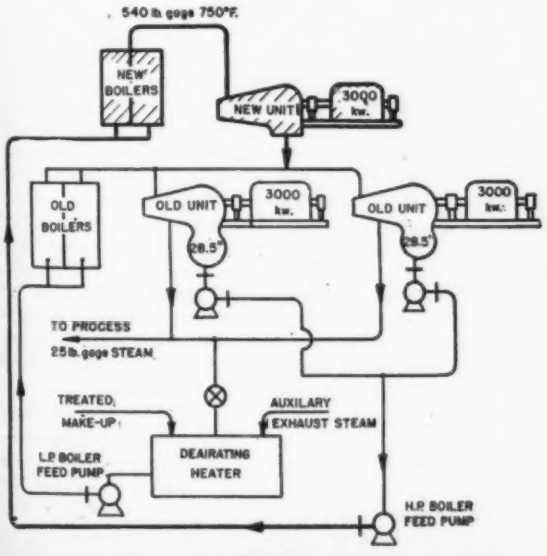

FIG. 10
Flow Cycle for Industrial Plant with Top Turbine Installation.

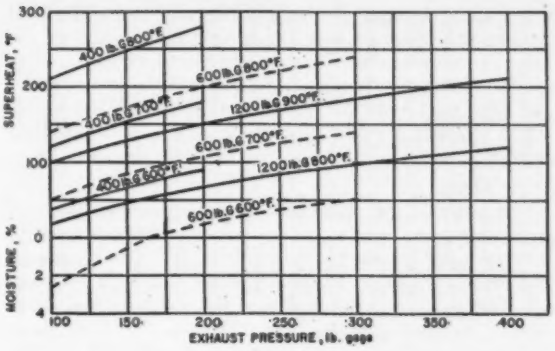

FIG. 11

for the top turbine knowing the throttle pressure and temperature which the existing equipment will stand. After the proper initial steam conditions are selected for the top turbine, refernce to Fig. 12 will indicate the approximate kilowatt which can be developed with each 10,000 pounds of steam passing through the turbine. This will assist in determining the size of the top turbine.

The total steam used in the old installation is determined from the guarantees or from actual tests. With the bleeder turbine there is furnished a complete diagram showing the total steam flow for certain amounts of steam bled with certain fixed load. This type of diagram is shown in Fig. 13. It gives the limits for the maximum steam flow, maximum bleeding, and the minimum steam flow for no bleeding.

Maintenance and Inspection

The successful and efficient operation of steam turbine generating units requires not only the maintenance of the various elements in a first class mechanical condition but also that the operating conditions are kept within the limits specified. This latter is important for the reason that the unit is designed for best efficiency when operating at certain specified conditions. During the periods when the unit is in operation, it is necessary to keep an accurate check of any changes that may interfere with the efficient operation and also to take frequent readings of pressures, temperatures, etc.

Steam Turbine Maintenance During Operation

The condition of the steam coming from the boiler must be free from carry-over which will settle on the blading and thereby reduce the capacity of the turbine or settle on valve parts, which in turn will interfere with regulation on account of sticking of the valves. The steam should also be free from any corrosive element that may damage internal parts of the unit.

All metals expand when subjected to increasing temperatures and, therefore, the turbine units should be so designed that expansion will take place in all directions without any obstruction, otherwise distortion can take place that may seriously interfere with operation. Strains set up by uneven expansion are very often the cause of vibration and if of sufficient magnitude may cause permanent distortion or failure because of excessive stresses. It is well worth while to check the expansion of the complete steam turbine as this check will indicate whether there is any interference in the free expansion of the unit. It may also indicate whether there are any internal changes in temperature distribution inside the turbine cylinder.

Any such changes in temperature will cause the unit to expand more or less, depending upon whether the average temperature is increasing or decreasing. Any such changes should be thoroughly investigated as they may indicate that a serious condition exists in the proper distribution of the steam in the turbine blading.

Vibration

Another check that should be taken at frequent intervals and entered into the log sheet is the vibration of the unit at the bearing pedestals. It is realized that there may be changes in vibration with changes of load caused mainly to the difference in temperature distribution in the unit. However, the readings will be of real value when used as a comparison with other readings taken from time to time as they will indicate whether there are any changes in the smooth running of the unit.

Clearance Check

The efficiency of the turbine unit is to some extent dependent upon the maintenance of certain close clearances in the blading and the dummies. It is, therefore, of considerable importance that the turbine unit is equipped with means that will permit the operator to check these clearances at all times. When designing the unit, care should be used in arranging the parts, both stationary and moving parts, in such a manner that they will expand uniformly together without any changes in the relative position of the parts. It is realized that even with the best design there will be some differences in expansion during the time the unit is brought up to normal temperature. Of considerable importance is a measuring device that will indicate the axial clearances between dummies and balance piston surfaces. A measuring device of this type is shown in Fig. 14. This device consists of a special micrometer gage mounted in the end of the cylinder and arranged to be set against a fixed point in the cylinder and then turned around and pushed against the side of the balance piston of the turbine spindle. The relative position between the fixed point in the cylinder and the end of the balance piston is determined by pulling the spindle up against the dummies so that there are no clearances between the dummies and the balance piston. After this check has been made, the turbine spindle can be moved away from the dummies a fixed distance.

Glands

The glands at the ends of the turbine shafts are of the labyrinth, carbon, or water seal type, or a combination of two types. Their function is to prevent air from leaking into the vacuum space or steam leaking out into the air when the inside pressure is above the atmospheric pressure. The operation of the glands is in general automatic when once properly adjusted. During operation it is only necessary to check the conditions and take readings of any instruments used for checking the conditions.

In the water seal gland it is necessary that the proper amount of water is allowed to pass through the gland in order to prevent steaming and also that the water should be of such a character that there will be no scaling of the gland from line or other foreign matter.

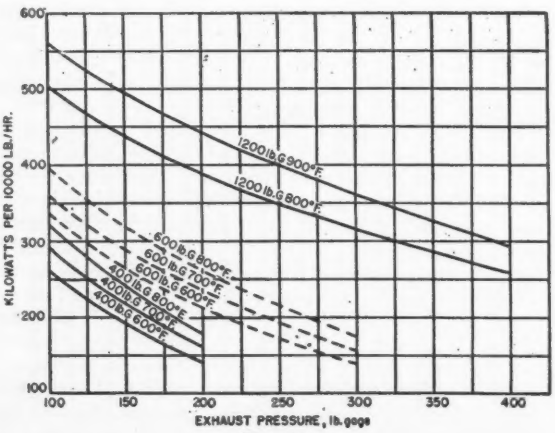

Fig. 12

Lubrication

In high speed machinery such as steam turbines, the proper lubrication of bearings and other parts is of vital importance. The shafts are supported on a thin film which prevents metallic contact between the journal and the bearing shaft. In order to maintain this film, the oil used must be of a certain quality free from any dirt and maintained within a certain limit of temperature. It is difficult to build a system which will prevent any foreign matter coming in contact with the oil and it is, therefore, necessary to provide filters and strainers in the oiling system in order to maintain the oil in the proper condition. Usually it is customary to provide a continuous filtration system that will maintain the oil in a clean condition during long periods of time. However, it is good insurance to make tests of the oil from time to time to see that there are no changes in the lubricating qualities of the oil. The system should be arranged so that no water can enter the oiling system. Water will not only emulsify the oil but when mixed in the oil and circulated through the system, it will cause corrosion of various parts. This condition is particularly harmful when oil is used in the regulating system. The temperature of the oil should be measured before and after going through the cooling system as well as at the discharge from all the bearings. Any changes in temperature may indicate either that the oil flow to the bearing has changed or that some internal change has taken place in the bearing itself, in which case the bearing should be inspected without any unnecessary delay.

Governor Gear

The governor gear is an important and essential auxiliary to the steam turbine. The standard speed governor controls the opening and closing of the steam inlet valves as the load on the unit changes. It is, therefore, readily understood that it must be maintained in perfect operating condition at all times. The moving parts, such as levers and links, are numerous and consequently proper lubrication is essential in order to prevent, as far as possible, any excessive wear in pins and bushings. Certain parts of the governor itself are enclosed and consequently can be lubricated from the continuous steam turbine lubricating system. Other parts, such as connections between the governor and the inlet valves, must be lubricated by hand at stated intervals.

The governor is usually driven from the turbine shaft through worm gears. These gears are also subjected to wear and it is of considerable importance that these gears be inspected at frequent intervals in order to prevent any serious shutdowns through the breakdown of these gears. It is also advisable to check the wear in pins and bushings in the connection between governor and inlet valves whenever the unit

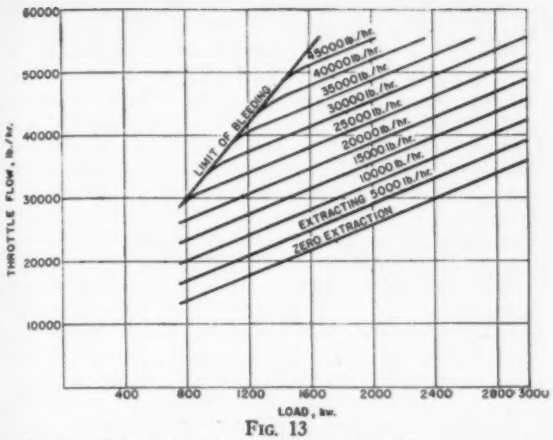

FIG. 13

Extraction Performance Chart. 3,000 k.w. Condensing Automatic Extraction Unit. Steam Conditions:—425 lb. G—100° F.—28 Vacuum Extraction at 40 lb. G.

is shut down. Usually the valves are operated by means of oil pressure actuating a power piston. The relay valve connected to the governor, which controls the movement of the inlet valves through the power piston, should also be inspected whenever there is any suspicion that there might be sticking during operation.

INLET VALVES

The inlet valves controlling the steam flow to the turbine must be maintained in proper operating condition at all times. It is essential that the valves move freely without any sticking. The sticking of these valves may be caused either by carry-over with the steam or by improper adjustment of the glands. The tightening of the gland should be just enough to prevent steam leaking through the gland, as tightening beyond this point may cause sticking. When the unit is shut down, it is advisable to move the valves up and down several times by means of the relay valve in order to check whether the valves are functioning properly.

THROTTLE AND TRIP VALVE WITH TRIP MECHANISM

A combined throttle and trip valve is used for admitting and closing off steam to the unit by hand or by automatically shutting off of the steam to the unit in case of overspeed. During operation this valve is always in a stationary position and, therefore, may stick, particularly if there is any carry-over from the boilers. There are also other possibilities that may cause sticking of this valve, such as deterioration of the gland itself. In order to maintain this valve as far as possible in proper condition during operation, instructions should be issued to the operator to partly close and open this valve at definite periods. Usually the proper time to do this is when there is a change of operators. This partial closing should be recorded on the log sheet and if there is any unusual action of the valve when operating in this manner, it should be recorded. It is understood, of course, that the valve cannot be closed more than a certain amount, depending upon the load being carried on the unit at that time. With this operation of the throttle valve, the operators may be reasonably sure that the valve will move freely in that part of the stroke it has moved during this operation and consequently the valve can be assumed to operate without any difficulty in case of an emergency. If there should be any sticking in the last part of the stroke undoubtedly that will not be serious enough to prevent the valve from closing because of the accumulated energy stored in the moving parts of the valve during the first part of the stroke.

The tripping mechanism between the centrifugal stop governor and the throttle valve must also be maintained in good operating condition. Naturally the various bearings, pins, and bushings are lubricated at definite intervals. Usually the mechanism cannot be operated except when the unit is shut down. However, whenever the unit is shut down, it is customary to pull the hand trip lever in order to be sure that the whole mechanism as well as the throttle valve is functioning properly. The centrifugal stop governor can usually only be operated by overspeeding. In some cases, the stop governor is arranged so that it may be operated by an oil pressure mechanism actuating on the governor. With proper precaution this can be done while the unit is in operation. Usually the stop governor is of such a design that the chances for any difficulty are very slim. The tripping mechanism with connections to the throttle valve is more likely to cause sticking, consequently it is not of great importance that the stop governor is arranged to be tested under normal speed.

It is advisable to overspeed the unit in order to test not only the overspeed governor but also the complete mechanism, together with the throttle valve. This overspeeding can only be made when there is no load on the unit, therefore, the testing at specific intervals is not practical. Instructions covering this overspeed testing should be obtained from the turbine manufacturer.

RECORDS

Pressure and temperature reading at various points in the steam turbine unit will usually indicate whether the internal condition of the unit is being maintained. If there are any changes in pressures and temperatures with the same steam and pressure conditions and with the same load, it usually means that some change has taken place in the internal condition. These changes may consist of changes in internal clearances or loss of blading. Loss of blading will manifest itself by change in the vibration. Changes in internal clearances, however, may take place without there being any outside indication of any change. It is, therefore, of certain importance that a complete record is kept of pressures and temperatures at various points of the unit. Usually these pressures and temperatures are taken at the point where steam is bled for feedwater heating. In the superheated region a check can be made of the internal efficiency of the sections of blading between various points and by this means changes in the internal efficiency may be discovered. The records will permit the operators to make comparisons from time to time.

Inspection

A thorough periodic inspection of all the elements of the turbo-generator unit is required in order that the unit shall fulfill its function reliably and efficiently. The time between such inspection is determined by the conditions in the power plant and also whether there are any unusual occurrences in the operation of the equipment. It has been the custom in the larger power plants to make an annual inspection of the steam turbine unit and arrange this inspection at a time when it would interfere the least with the operation of the power system. Lately some power plants are now making this inspection of the turbo-generator equipment once every two years. Undoubtedly, where conditions are ideal, this periodical

inspection may even be extended to three years. It is, however, advisable, before any definite decision is made concerning this periodical inspection, to consider the various conditions that affect the reliability of operation and also consult with the manufacturer for his opinion.

Before the machine is shut down for this periodical inspection, a definite program covering the complete inspection should be made up beforehand so that there will be no loss of time between the shutdown and until the unit can again be put in operation. As a guidance for this program the operating records since the last inspection should be gone over in detail and if during that time there have been any noticeable changes or disturbances in any part of the equipment it should be noted in the inspection program so that when the unit is dismantled the parts causing this disturbance may be properly inspected.

If there are parts that require replacement, they should be inspected immediately the unit is taken apart and if not carried as spares, orders should be placed without any delay as the manufacturer may not carry these parts in stock. When arranging the program this should be kept in mind and the program should be so arranged that the order of dismantling and inspection will take into consideration the time element so that the complete inspection may be finished without any undue delay. It is understood that a definite procedure can only be formulated by those familiar with all the details. It is here the intention to indicate certain methods that may be useful for the various power plant operators in making up a program that will suit their particular equipment.

When arranging the program for the inspection, it is advisable to make up beforehand certain tables or charts on which can be recorded any measurements or notes giving information concerning the condition of the various elements. When the inspection is completed and the unit is again put into operation, these records and notes may very profitably be bound in a book covering the complete inspection. This book will then be available for references and the condition of the unit can be compared with the condition found at subsequent inspections.

Checking all Clearances

When the load is taken off the turbine and the unit shut down for inspection, it is advisable to ascertain the minimum hot axial clearance between spindle and cylinder. Usually the minimum clearance exists in the axial dummies. This hot clearance or striking point can be obtained by pulling the spindle forward as far as it will go until it strikes the dummies and then pushing it in the opposite direction until it again strikes the back of the dummies, and after each movement measure the position by the measuring device mentioned in the previous part of this paper. The forward movement will give fairly accurately the actual running clearance. These striking points should be obtained either when the spindle is rotating at slow speed or immediately after it has stopped turning and before any appreciable change in temperature has taken place. These measurements can then be used as a reference in determining the relative position of the spindle to the cylinder when at operating temperature.

As soon as the unit is shut down and has cooled off sufficiently to dismantle, the lagging will be removed, the horizontal cylinder joint unbolted, and cylinder covers lifted, likewise all the bearing covers for the unit are removed. By that time the cylinder and the spindle have cooled down near to the room temperature.

Before the spindle is removed from the cylinder it is important that complete measurements of all clearances are taken and recorded. These measurements consist of axial and radial clearances of the blading, axial clearances between balance piston and dummies and radial clearances between spindle shaft and gland and oil baffle dummies. A diagram, as shown in Fig. 15 indicating all the points where these measurements are to be taken, should be made up beforehand and available so that there will be no delay in having this record made. The measurement should be taken on both sides of the turbine spindle and if possible the up and down radial clearances should also be recorded in order to determine fairly closely whether turbine spindle is located central with the center of the turbine cylinder. If the turbine spindle, by the time measurements are completed, is cooled down evenly to the room temperature, it is advisable to rotate the spindle and check whether it runs true. Later, before the turbine is again reassembled, it should again be checked to see whether it runs true and a record made of this check. The coupling between turbine and generator should be disconnected before this check is made.

While the above measurements are taken and recorded, other parts of the turbine unit such as the throttle valve, steam strainer, inlet valves, etc., with any other parts of the equipment that require inspection can be dismantled so that there will be no unnecessary delay in completing the inspection.

Cylinder

In spite of all the care taken in preparing the materials for the steam turbine cylinder, some distortion after certain periods of operation may take place. It

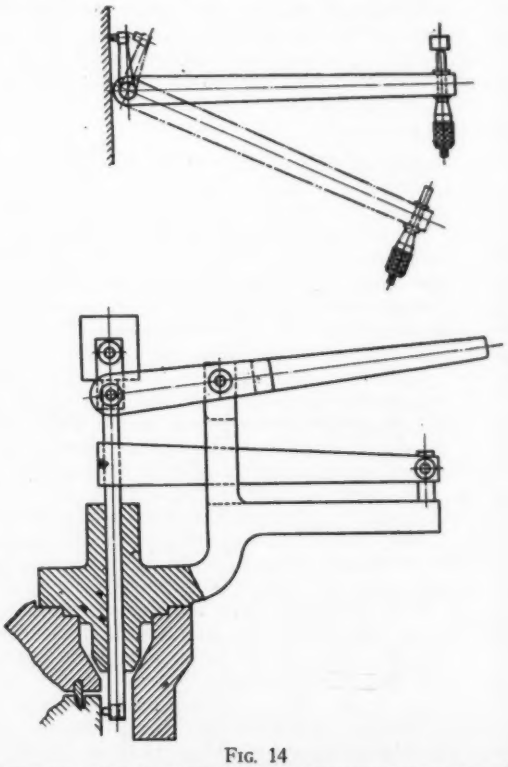

Fig. 14
Micrometer Device for Measuring Axial Clearances Between Dummies and Balance Piston.

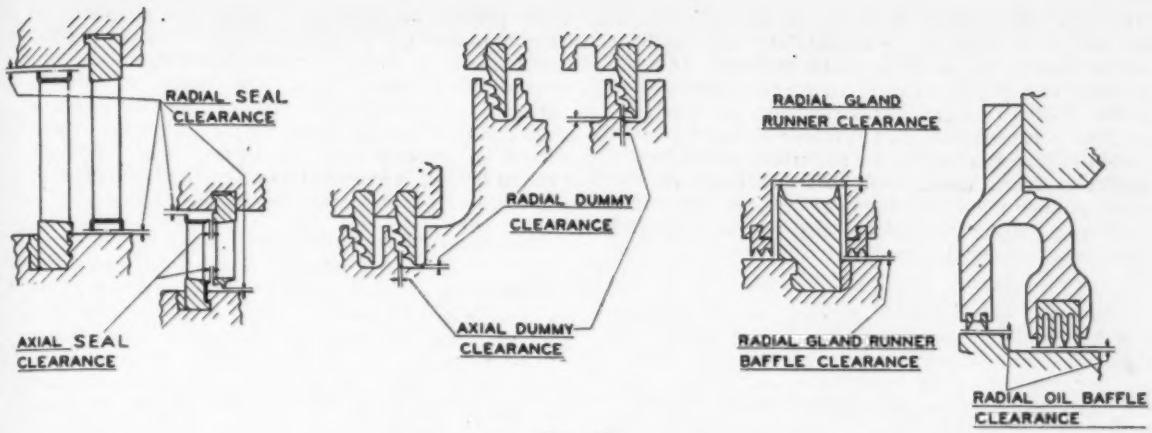

FIG. 15
Arrangement for Taking Cold Clearances between Cylinder and Spindle.

is, therefore, advisable to check the various bores in the cylinder to determine the actual shape as it is sometimes possible to partly correct the dertimental effect of this distortion. Likewise the cylinder joint between the upper and lower half of the cylinder should be thoroughly inspected and any high spots on the joint, which may prevent the making up of a tight joint, should be filed down until the joint surfaces are in contact at all points where the actual seal is made. This inspection of the surface should be made both in transverse and longitudinal directions.

WORM GEARS

The worm gears driving the speed governor should be checked before the governor is dismantled from the turbine. This check consists of measuring the clearance or backlash between the teeth at the contact point. A record of this clearance should be made so that each subsequent inspection may be compared and the rate of wear of the gear determined. With this check it is possible to predict fairly definitely when the gears need replacement.

GOVERNOR AND CONNECTIONS

The condition of the governor should be checked as there are various parts, such as pins and bushings, that are subjected to wear and it may be necessary to replace some of these parts. The bearings for the governnor spindle should, of course, also be checked to see whether there is any wear in these parts, likewise all the governor links and levers connecting the governor gear with the main inlet valves should be checked to determine whether any wear has taken place in the bearings and bushings of these parts. In making all these checks, as mentioned before, it is advisable to make a record of not only the wear that has been found but also a record of parts that are in good condition as in this way a comparison may be made of the condition at each subsequent inspection.

THROTTLE VALVE

When shutting down the unit for inspection, the operation of the main throttle valve should be checked to ascertain whether it operates properly. Tripping of the throttle valve is usually done by pulling the hand trip lever as soon as the load on the unit is taken off. In addition, after the unit has come to rest and the shut-off valve in the steam pipe to the turbine has been closed, it is advisable, before dismantling the throttle valve to operate the valve with the tripping mechanism in order to ascertain whether it operates satisfactorily. During this tripping, a check should be made to determine the time it will take between pulling the hand trip lever until valve is seated. A record of this operation should be made and kept for future comparison.

As soon as the valve is dismantled, a thorough check should be made on the conditions of the valve seat, guides, and bushings, and measurement taken to see whether there is any wear in any of these parts. The valve stem should be checked for trueness to see that the stem has not distorted during operation. Any distortion may cause the valve stem to stick at some point and thereby interfere with the proper closing of the valve. It is understood that after inspection is made of the turbine unit and all the parts reassembled, that the throttle valve should be thoroughly tested out a few times before putting the unit in operation and the closing time again checked and recorded. This is of importance when reassembling and adjusting the gland, as it may have been improperly adjusted and other parts incorrectly assembled. It is vital that anything wrong is discovered before starting the unit. If during the inspection the valve seats show signs of leaking, the valve seats should be ground in with the valve in place.

INLET VALVES

The inlet valves also require a checking over and as soon as dismantled, parts should be thoroughly inspected and if any new parts are required, an order for these parts should be placed immediately as it usually takes a few days to manufacture such parts. The valve seats should be thoroughly checked and, if required, should be ground in. Clearances in guides and bushings should be carefully checked and if larger than specified, this condition should be called to the manufacturer's attention because too large a clearance in the inlet valve guides may cause vibration of the valves when the valves begin to open. When reassembled, the valve should be thoroughly tried out and the glands adjusted so that there will be no excessive friction between valve stem and the gland itself, as any sticking will interfere with the proper regulation of the turbine unit.

THRUST BEARING

The thrust bearing maintaining the axial position of the spindle with relation to the cylinder is a vital element in a steam turbine unit. It should, therefore, receive a thorough check whenever the unit is down for inspection. Before dismantling the thrust bearing,

the axial clearance or float between the thrust faces should be checked. After dismantling, the condition of the bearing surfaces should be carefully inspected in order to make sure that there are no flaws in these parts. When reassembling the bearing, the clearance or float between the thrust surfaces should be readjusted to that specified by the manufacturer. Usually this clearance is from about 0.006 to 0.010 inch, depending upon the size and type of bearing. The thrust bearing adjusting gear should also receive a careful check as those parts are subjected to wear.

Main Oil Pump

The main oil pump or pumps, driven through worm gears from the turbine spindle, should also be dismantled and a careful check made of the condition of the pump parts. This pump is usually of the positive displacement type, the most common pump consisting of two or more gears. The condition of the rotating parts as well as the bearings and housing should be checked to see that there is no wear. Proper clearances must be maintained both in the bearings and between the gear and housing, in order that the pump may deliver its rated capacity. The actual clearances should be obtained from the manufacturer as they may vary depending upon the size and construction of the pumps. In all cases a record should be made of the condition and the clearances so that comparison may be made at each inspection.

Auxiliary Oil Pump

The auxiliary oil pump used principally when starting, shutting down the steam turbine unit, or for emergency purposes, should receive a thorough check. It is of vital importance that this pump is maintained in good operating condition at all times. Normally this pump is of the centrifugal type and driven by a small steam turbine. In many cases two auxiliary oil pumps are furnished, one steam turbine driven and one motor driven. The motor driven in that case is normally a gear type pump. Both the centrifugal and the gear type pump should, of course, be inspected for wear in the various parts, the same as the main oil pumps, and records made of their conditions.

Oil Pressure Regulator

Another element of vital importance is the pressure regulator controlling the steam flow to the steam turbine driven auxiliary oil pump. This regulator is operated by the oil pressure in the system and arranged so that when the oil pressure falls below a certain point, the regulator will open the steam valve and start the auxiliary oil pump. When the pressure is sufficiently high, the regulator will shut off the steam. This regulator will operate in case the main oil pump stops.

Inspection of Steam Turbine Driven Generators and Exciters

A regular schedule of inspection should be adopted and maintained for generators and exciters as soon as they go into service. Modern, closed ventilating systems prevent any great accumulation of dirt, or foreign material in the generator but there are certain parts such as collector rings, commutators, and brushes which should have frequent and regular attention. Some units often run for months without a shut-down and during these periods, of course, only superficial inspection can be made. The following general outline is intended to cover the most important features of inspection and maintenance.

Generator Armature Winding and Leads

Turbine generator units are usually shut down for an inspection of the turbine at least once a year. At this time the end covers should be removed from the generator and the armature coil ends, connections, and leads carefuly examined. Even in a closed system of ventilation there will be some accumulation of dust and this should be blown out with compressed air. Condensation often occurs in air lines and care must be taken that the air is free from such moisture before it is directed into the generator. After blowing out thoroughly, all exposed surfaces may be wiped off to remove any remaining greasy dust or dirt.

The bracing and cording of the coil ends and leads should be examined for any evidence of looseness. Stresses set up by short circuits or vibration may cause damage and consequent movement of these parts. If there are any signs of movement of chaffing the bracing must be renewed.

The compact construction of the rotor prevents any internal inspection. However the fans and all bolts and nuts may be examined for any signs of looseness.

After cleaning, the coil ends and connections should be given one or two coats of air drying varnish. This is best applied with a spray in thin coats.

Care must be exercised in removing and replacing the end covers in order to prevent injury to the insulation of the coil ends.

Generator Collector Rings and Brushes

These should be inspected daily to be sure that there is no sparking, pitting, or undue wear and that the brushes are uniformly seated on the rings. Each brush should have just enough clearance in the holder to move easily in a radial direction with respect to the ring.

In general, brush pressures on generator collector rings vary from 2 to 4 p.s.i. depending upon the grade of brush used, current density in the brush, and speed of the collector rings. The manufacturer should be consulted for definite recommendations as to the proper brush pressure for each generator.

Replacement will be necessary from time to time because of brush wear. The grade of brush should not be changed without first consulting the manufacturer since he is best qualified to recommend the proper grade.

When installing new brushes they should be carefully fitted to the collector rings so that they make uniform contact over the entire face of the brush.

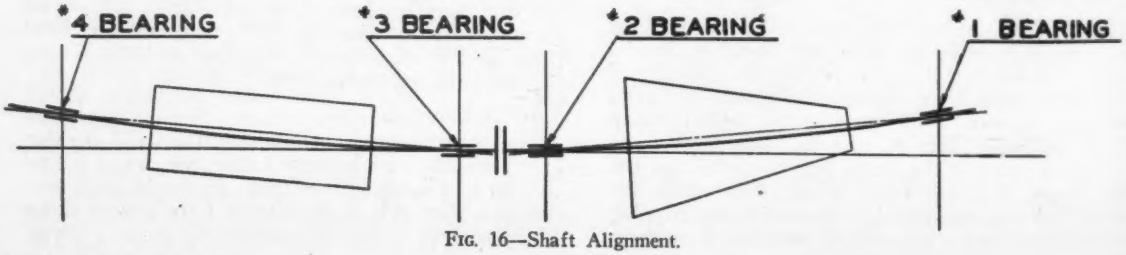

Fig. 16—Shaft Alignment.

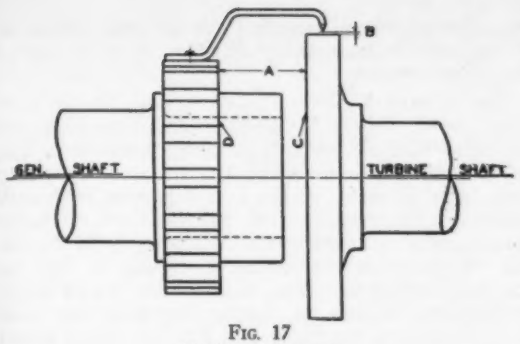

FIG. 17
Checking Alignment.

Coarse sandpaper may be used first and the final fit made with fine sandpaper. Emery paper or carborundum should not be used. The sandpaper may be inserted under a few bruses at a time, rough side against the brushes and with moderate tension on the brush springs. Care must be taken to keep a fairly large arc of contact between the paper and the rings to avoid rounding off the leading and trailing edges of the brushes. After running for a few hours the brushes should be examined and if not well seated further sanding should be done.

There will be some accumulation of carbon dust on the shaft, rings, insulation, and brush rigging due to the brush wear. This may be blown or wiped off when the machine is shut down.

Where the brushes and rings are subject to severe service it is good practice to reverse the two field leads occasionally. This reversed polarity often improves brush operation.

No oil or grease must be allowed to get on the collector rings or brushes.

Bearing Insulation

The outboard bearing pedestal of steam turbine driven generators is insulated to prevent the circulation of shaft currents. Oil piping connected to this pedestal also will have an insulated union. Direct connected exciters and piping are similarly insulated. Ordinarily this insulation requires no special attention except that it should not be painted with metallic paint. In case the rotor, or exciter is removed all joints must be carefully reassembled so that the insulation remains effective. One small metallic chip or sliver in the bottom of a bolt or dowel hole can destroy the value of the insulation.

Main and Pilot Exciters

Exciters may or may not be enclosed. In any case any accumulation of dust should be blown out at regular intervals with dry compressed air. All exposed parts should be wiped clean with a dry cloth. In using compressed air any foreign material should be blown out and away from the machine and not down into any of the crevices formed by the armature coils or commutator connectors. After thorough cleaning, one or two coats of thin air drying varnish sprayed o nthe coils and insulated parts will preserve the insulation and prevent absorption of moisture. This should be done at least once a year.

Exciter Commutators

Seasoned commutators usually require no special attention beyond keeping them free from oil or grease. After some years of service they may require turning to get a true, uniform surface. After turning it may also be necessary to undercut the mica insulation between bars. The turning or resurfacing is preferably done with the armature running in its own bearings and at normal speed although this may not always be possible. The final finish should be given with fine sandpaper or sandstone taking precautions not to form any flat spots on the commutator surface. On high speed units this resurfacing requires considerable care and should only be attempted by an experienced operator.

Exciter Brushes

Brush operation should be inspected daily and notation made of any irregularities such as unusual wear, sparking or vibration.

Brush pressures on exciters should be maintained at 2 to 2.5 p.s.i. All brushes must be uniformly seated and the commutator must be smooth and true. In case of replacement of brushes because of wear the same general method is used as outlined for brushes on collector rings. Carbon particles resulting from the sanding operation must not be allowed to get into the armature windings.

Insulation Resistance

It is good practice to keep a record of insulation resistance on the generator and exciter. Readings may be taken by means of a suitable megger, ohmmeter, megohmer, or with a high resistance voltmeter in series with the circuit. In the latter case a direct current supply of 500 volts should be employed since the insulation resistance is apt to show a lower value the higher the applied voltage.

Insulation resistance may afford a useful indication whether or not a machine is in suitable condition for test or operation. A high value of insulation resistance is not by itself proof that the insulation does not have cracks or other faults which may cause break-down upon application of voltage yet do not greatly affect the measured value of insulation resistance. Temperature, humidity, and the cleanliness of parts will cause wide variations in insulation resistance.

It is impossible to set any definite value for insulation resistance since it varies greatly with the type, size, voltage, rating, kind of insulating material used, and method of construction. Considerable judgment based upon experience should be exercised to determine whether a machine is suitable for service.

The following rules are given in the A.S.A. Standards to indicate the order of the values which may be expected in a clean dry machine at approximately

$$\text{Insulation Resistance in Megohms} = \frac{\text{Rated Voltage of the Machine}}{\frac{\text{Rating in KVA}}{100}} + 1000$$

75°C. For d.c. machines KW may be substituted for KVA in the above expression.

The minimum insulation resistance of the fields of machines separately excited with voltage less than the rated voltage of the machine should not be less than one-half to one megohm.

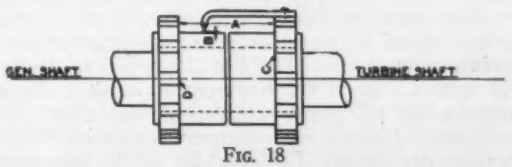

FIG. 18
Checking Alignment.

Insulation resistance readings should be taken when the machine is hot. If all readings are taken at approximately the same temperature an abrupt change in the insulation resistance has more significance than the actual value in megohms.

Vibration and Coupling Alignment

When shutting a generator down vibrometer measurements may be made from full speed to standstill. A continuous record of such readings is useful to indicate any changes which may take place and cause variation in the balance of the unit. Such readings may be taken during the starting period but the deceleration period usually affords more time to get accurate readings.

Vibration may cause loosening of the dowel pins and holding down bolts on the generator or exciter. These should be tested occasionally for tightness by sounding with a hammer or using a wrench.

Under normal operation the generator rotor will run with practically no end play or oscillation in an axial direction. The generator rotor bearing nearest the main coupling has thrust collars which prevent such movement. After some years of operation a tendency to oscillate may appear. This may be accompanied with a pronounced bumping on the thrust collars. This is usually caused by coupling wear or misalignment and the couplings should be thoroughly checked.

Bearings

Details regarding the proper grade of oil, amount, etc., are given in the section on turbine operation and maintenance. It is imperative that no oil escape from the bearings and get into the generator or exciter windings. Frequent inspection should be made for such leakage. The generator and covers are provided with observation windows which permit internal inspection of the bearings, shaft, and coil ends.

Rating

Each generator and exciter carries a nameplate which gives the normal allowable load and temperature rise. These values should never be exceeded without first consulting the manufacturer.

Repairs and Supplies

When ordering replacement parts and supplies always give the serial number of the machine and any other data which appears on the nameplate.

Reassembling

The reassembling of the various elements of the turbine unit should be arranged in accordance with a set program or schedule so that the unit can be ready for operation without any loss of time. With this in mind and while the main parts are being inspected, the smaller items, when ready, can be assembled.

There are a few items when assembling that require a careful check in order that the completed unit shall be in proper condition when ready for operation. When the blading in the turbine spindle and cylinder and other parts of these elements have been inspected and found in good condition, the spindle is assembled with the lower half of the cylinder. Before any further assembling, measurements of all the clearances in blading, glands, etc., should again be taken and recorded in the same manner as mentioned in a previous paragraph. This checking of clearances can then be compared with the previous measurements. An accurate record covering the internal conditions of the unit is then obtained when all parts are at room temperature.

The alignment of the turbine spindle to the generator rotor should be checked and accurately adjusted to insure a smooth running of the unit. The two shafts should be arranged so that under running conditions the ends are in exact alignment with each other and the centerlines of the two or more shafts should form a smooth curve coinciding with the deflection curves of the shafts, as shown in Fig. 16. In other words, the center lines of No. 2 and No. 3 bearings should line up central with each other and at the same time the No. 1 and No. 2 bearings raised until the deflection curves of the shafts will form one smooth continuous curve.

The usual methods used for obtaining this alignment are shown in Figs. 17 and 18. Figure 17 shows a half type of claw coupling with the coupling sleeve removed. This coupling sleeve is arranged to be bolted to a flange on the turbine shaft and claws in the opposite end of the sleeve engage claws in the generator end of the coupling. To simplify the checking of alignment surfaces C and D should be made true with the centerlines of the shafts and the outside diameter turned true with the turbine shaft. In that case the two shafts will be in line when dimension A is the same all around the circumference and when at the same time dimension B is the same around the circumference of the flange. Dimension B is taken by rotating the generator shaft with the turbine shaft stationary. If the surfaces C and D and diameter of flange are not true, it is necessary to rotate the two shafts together. When the measurements A and B are the same all around the circumference, the shafts will be in line. Figure 18 shows the usual type of claw coupling with coupling sleeve removed. The same system of alignment as described above is used for aligning shafts with this type of coupling. It is understood that if there are more than two shafts, the same system of alignment applies.

In some turbine units, particularly noncondensing units where the exhaust temperature is quite high, it is sometimes necessary to set the No. 2 turbine bearing next to the exhaust lower than No. 3 bearing because of increased expansion of the pedestal at the No. 2 bearing. The amount of this difference is determined at the time unit is first put in operation and a record of this setting should be kept so that at subsequent inspection, if there are any changes, the shafts can again be reset to the original position.

Another item of considerable importance is making up of the main cylinder joint. The different manufacturers use somewhat different methods and naturally the engineers having charge of the inspection are fully familiar with the various detail parts. It is, as mentioned before, important to have the joint smooth without any high spots so that when the nuts are tightened a uniform pressure is applied on the joint surfaces. The bolts should be lubricated by some special compound specified by the manufacturer before the nuts are assembled with the bolts. This compound, if made up of the proper materials, will permit the nut to be removed without galling of the threads.

After all the parts have been reassembled and unit is again ready for operation, care should be used in starting it up for the first time after inspection. Before any steam is admitted to the unit, a check of the float or clearance between the front and the back

of the dummies should be made and comparison made with previous check. If the unit has a micrometer device, as shown in Fig. 2, the relative position of the dummies in the cylinder and the balance piston should be obtained at the same time.

The oiling system should be thoroughly flushed by starting the auxiliary oil pump and operated for some time so that any loose grit or dirt will be washed out and carried back to the oil tank. If unit has a turning gear, it should be started and a small amount of steam admitted. This operation should be continued until unit is ready to be brought up to normal speed. If there is no turning gear, enough steam should be admitted that will allow the turbine spindle to rotate at low speed. The warming up of the unit the first time after inspection should be done slowly to be sure that there is no interference between the rotating and the stationary parts. During this time and during the time the unit is brought up to speed, the operators should listen for any internal rubbing or noises to be sure that there are no contacts between rotating and stationary parts. After the unit is up to speed, it should be loaded in accordance with instructions and the usual checking and recording of clearances between the rotating and stationary parts should be taken.

Experiences with a Spreader Stoker Installation*

By Arnold Urban[1]

Abstract

The changes and additions made in the boiler plant of a pulp and paper mill which doubled the original boiler capacity and increased the boiler efficiency at the same time are discussed.

By changing from an underfeed to an overfeed stoker it was possible to use coals of widely varying characteristics and also reclaimed sulphite waste liquor with efficiency and low maintenance. The stoker has no moving parts within the furnace and all moving parts are accessible for inspection and lubrication while in service.

The condensate return system was closed up and other equipment installed to save heat, reduce make-up water, and reduce wet steaming conditions.

Fly-ash was practically eliminated by use of an arrestor installed in the chimney and a roller curtain type of damper was installed to reduce air leakage that affected the drafts.

A final addition was the installation of superchargers which aided combustion appreciably by creating more favorable furnace conditions. The advantages are cited.

As the steam demand in the Rothschild plant of the Marathon Corporation increased there were several changes and additions made in the boiler plant, which doubled the original boiler capacity and increased the boiled efficiency at the same time.

Plant Units

The main boiler plant consists of six boilers from 22 to 30 years old. These are: four 390 hp. four-drum bent tube boilers, one 600 hp. four-drum bent tube boiler, and one 871 hp. strait tube cross-drum boiler. In addition to these boilers there are six 37 year old scotch marine boilers used to burn wood refuse from the woodroom operations and the hogged wood from nearby sawmills, when it is available. This old plant is also used as a standby in case of a breakdown of the water tube boilers.

The Rothschild Division has a sulphite mill and bleach plant with a daily capacity of 120 tons of pulp, using balsam, hemlock, and spruce wood. The paper mill has four paper machines; one board machine, two fourdriniers and a yankee machine; producing 170 tons of paper per day which is mainly used for food cartons and waxing. There are also various coating and laminating machines making paper for special food containers.

The electrical generating capacity includes a large back-pressure twin Corliss engine, two steam turbines and a hydro plant. The hydro plant has always been the stumbling block in getting new high pressure boilers and topping or back pressure turbines. During times of ample water in the river there would be no use for the electrical energy produced by high pressure steam, consequently, during those times the installation would earn no money, but the fixed cost and overhead would go on. Therefore there was no economic justification in discarding the low pressure boilers and present engines and turbines.

For comparatively short periods when the river flow is low, or very high, the steam plant and transmission line supply the deficiency of electrical energy from the hydro plant. A system of water storage reservoirs, hydro plants, and stand-by steam plants operated by the public utility supply ample electrical energy at a reasonable cost.

Stokers

Originally the boilers were equipped with underfeed stokers of two different makes. With the underfeed stokers the average monthly rating was about 75% in summer and 120% during the winter, with a yearly average of 110%. As the load increased, part of the underfeed stokers were removed and overfeed spreader stokers were installed. Now all the firing is done by overfeed stokers. The overfeed stokers which are being used are capable of burning most coals of characteristics from hard coal screenings and coke breeze to high or low volatile, high or low ash fusion point coals. Reclaimed sulphite waste liquor which has about 50% moisture and about 4000 Btu. per pound, was successfully burned on them at a

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continuous rate of 95 pounds per square foot of grate surface. The fuel is spread thinly and uniformly over the entire grate area which is level. The air is introduced uniformly over the entire tuyere area without the assistance of fuel bed resistance. A turbulence is produced in the loose ash between the grates and the thin fuel bed and at the point of gas release which is within a short distance of the fuel bed. A uniform heat release results over the entire grate area without the stratification which often is present in the underfeed stoker operations.

The uniform heat release has a direct bearing on efficient operation because of more uniform heat absorption at the boiler surfaces. This lowers the flue gas temperature which in turn raises the efficiency. Blow holes cannot form in the fuel bed and therefore excess air introduction is held down. This results in higher and more uniform CO_2 in the flue gas. There is no necessity for barring the fires in order to close up holes or to break through coke crust formations as is necessary with some types of stokers, the frequency of which depends upon the type of fuel they are trying to burn. The reciprocating motion of the coal feeders prevents the bridging of coal in the hoppers when the coal is wet. This bridging caused a lot of trouble with the underfeed stokers. The main contribution to the success of the type of overfeed stoker being used can be attributed to the novel tuyere design. Because of its angular iar injection uniformly over the entire tuyere area combustion occurs closer to the tuyere surface. This angular air injection also creates a turbulence which compensates in part for the time element lacking in a low set boiler. The boilers are set quite low. There is no loss in the capacity during ash dumping periods, and the combustable left in the ash is low.

When the stoker equipment is properly operated there is never over a 4-minute fuel supply in the process of combustion at any time, and load swings varying from 50 to 250% of rating can be handled over a period of a few minutes. There is at no time a fiercely burning bed of thick fuel to continue to make excess steam after the peak steam demand has passed. This is also an advantage in safeguarding the boiler from damage in an emergency if the feedwater supply failed for any reason.

Water

The first limiting factor which prevented high rating was bad water boiling conditions in the boilers, resulting in wet, dirty steam. Four of the bent tube boilers have the steam take-off on the center drum, which creates a bad steaming condition. About 65% of the steam produced was returned to the boilers as condensate. By closing up the condensate return system and adding more collecting and return equipment, it was possible to reduce the amount of raw water make-up. This resulted in a saving of heat, a saving in boiler feedwater treating chemicals, and put a greater percentage of pure water back into the boilers. The feedwater treatment is closely checked daily by testing the raw water and the feedwater from each boiler. The raw water used is filtered river water and contains a high percentage of organic matter but only small amounts of hardness. Neither lime soda nor Zeolite softeners will solve the problem. A closely controlled internal water treatment is used and changes were made in the boiler plant to get satisfactory steaming conditions. Among the problems that had to be solved were wet, dirty steam, scale in boilers and preboiler equipment, oxygen and other intrained corrosion of preboiler equipment, and the protection of boiler metal from embrittlement.

A direct-contact, deaerating heater of ample size with additional storage capacity was installed with an automatic steam make-up valve which holds the heater temperature at 212° at all times. This removes most of the oxygen and some of the other gases. Steam purifies with rapid dumping traps, which are able to handle large amounts of muddy water, were installed on each boiler. These purifiers and traps reduce the amount of moisture in the steam to less than 0.5%. Internal baffles were also installed in the steam drum to help reduce the load on these traps and to prevent slugs of water from going up the steam nozzle. Feedwater regulators with differential pressure regulators were installed on each boiler to hold a safe water level with a minimum of fluctuations. This also helped reduce wet steaming conditions by keeping only a minimum safe level in the boilers.

To take care of additional steam load conditions, more efficient and larger capacity feedwater pumps were installed. In the case of the motor driven pumps the same motors were able to drive the new pumps which gave more capacity and pressure than the old pumps because of a more efficient design.

A continuous blowdown system was installed with a heat exchanger which recovers a large percentage of the heat in the water blown down from the boilers. The amount of blowdown from each boiler is regulated by a valve which is controlled by the feedwater regulator. It blows down a predetermined percentage of water entering the boiler. In this way the concentration of solids and soluble salts is kept constant with a minimum amount of water wasted. With intermittant blowdown, concentrations vary between periods and more water must be wasted to get the same results. The continuous blowdown gives cleaner boilers, drier steam, saves water treating chemicals, and saves from 2 to 2.5% of coal. This is a large saving considering the small investment, negligible operating cost, low maintenance, and no operating labor.

System Advantages

The stokers will operate successfully using the cheaper sizes of coals such as degradation which results from coal handling at the docks or mines. The coal used is one-quarter to zero size when they are obtainable at greater convenience or at a lower price. The success of the overfeed stoker firing can be summarized as follows: Dependability of the firing equipment; low maintenance cost which necessarily implies a minimum amount of outage for maintenance work; efficiency of combustion; a quick response to load changes and the ability to successfully burn most grades of solid fuels.

The stoker has no moving parts within the furnace and all moving parts are accessible for inspection and lubrication while in service. The equipment on each boiler consists of three or more unit feeders, each unit being capable of being taken out of service if necessary, in event of a failure, while the rest of the units continue to fire the boiler. The parts of the units are small and light in weight and are standardized and interchangeable. This makes a great difference between carrying in stock a few small inexpensive parts which may be easily handled and installed by one man, and the necessity of giving storage space and paying investment charges on several tons of iron or steel castings. To install this mass of castings on most stokers requires a lot of labor, and

the furnace must be cooled down at least 24 to 36 hours before repairs can be made.

The boilers were equipped with meters to record and indicate the amount of steam produced. They were also equipped with draft gages, recording pressure gages, and thermometers. To further guide the operators steam flow-air flow meters were installed. They record the steam and relative air flow and co-ordinate them on the same chart. This indication permits the firemen to control firing and produce the best fuel economy in addition to controlling other losses and operating troubles.

Construction Control

The steam demand to the pulp mill, bleach plant, etc. fluctuate widely, often varying at a rate of 100,000 pounds per hour within a few minutes. The load changes are beyond the control of the steam plant operators. To supply this swinging demand a standard metering type combustion control was installed with revisions. With the stokers and auxiliaries capable of following the steam variation quickly, the combustion control keeps the steam pressure constant within a narrow range. The control operates simultaneously the forced and induced draft dampers on the boilers and economizers, changes the amount of fuel fed by the stoker, and keep the desired draft in the furnace. It also changes the speed of the fan turbines and engines, and distributes the load between the boilers so that each unit carries its share. The fuel and air ratio is correctly maintained over a wide range of steam demands by the use of controllers which follow a predetermined curve to supply the proper amount of air regardless of the position of the controlling dampers.

The bent tube boilers, as installed, had the standard vertical baffles. These were replaced by cross flow baffles which reduce the possibility of short-circuiting, promote more efficient transfer of heat and put more heating surface in the first pass of the boiler. These baffles allow the soot blowers to do better work and reduce the number of places where soot and fly ash can remain. There is less heat reflected down on the grates which helps to reduce clinkering. The baffles are made of reinforced fireproof plastic which results in a thin, gas-tight, and fireproof wall of great strength.

The economizers originally contained smooth cast-iron tubes and headers. The heating surface was increased by replacing the cast-iron elements with extended surface steel elements. In this way much more economizer heating surface was put in the same casing. This helps keep the efficiency up by reducing the temperature of the gases going to the stack.

Induced draft fans were driven by steam engines. In some cases the power of the engines was increased by changing the valve design. Where the engines were too small they were replaced by motors. In this way the available induced draft was increased to take care of additional gases and also to compensate for the resistance of the fly ash collectors.

Fly-Ash

It was known that fly-ash was a nuisance to the mill and the neighbors and also that there was considerable unburned carbon in the fly-ash which could be burned if practical equipment could be installed to collect it and convey it back to the furnace. To collect this fly-ash novel collectors were installed inside of the chimneys, and resting on the top of the firebrick linings inside.

The arrestor consists of a double walled metal cylinder with a stationary helicoid near the bottom which gives the stack gases a directional change. Cinders and ash are deflected by the helicoids and are forced to travel around the inner jacket, ultimately passing through the collector into the annular space between the double wall where they are caught in a downward whirling draft and swept into gravity conveyor pipes.

There are no moving parts to this collector and no power is required. The design is such that there is little change in the lineal speed of the stack gases; accordingly loss caused by acceleration and deceleration are eliminated and are limited to those caused by the friction due to greater travel in following the helical path instead of a straight one. The draft loss through the collector is very low, for its operation is not governed by the accepted design that requires high draft loss in order to obtain efficiency.

The cost of these collectors was low and they take up no space in the boiler room. They have proved very satisfactory and there have been no fly ash complaints. The fly ash collected in these devices and also that collected in the last passes of the boilers and economizers is returned to the furnace with high pressure air where it is reburned. This represents a noticeable heat recovery. Contrary to theories advanced by some engineers it has been found that only a small percentage of this returned material passes out of the furnace for a second time as most of it falls on the grate where it burns.

The boilers are set in battery and the boiler installations and settings are such that it is impractical to install water cooled walls. To reduce fire brick maintenance and outage due to refractory failure sectionally supported air-cooled and insulated walls were installed using intermeshed tile for battery walls, bridge walls, arches and other parts of the furnace which get the most severe service. The supported walls have longer life, make repairs simpler and greatly reduce the number of brick required to make repairs in addition to reducing maintenance and boiler outage time and cost.

To maintain a high efficiency month in and month out, it was found all small losses had to be stopped, if the cost of reclamation is justified. Thoroughly insulating all steam and hot water lines, insulating tops and settings of boilers and stopping all air leaks in settings paid dividends in fuel savings.

Dampers

It was realized that there was considerable leakage in the conventional type of breeching dampers due to twisting, warping and settling of the breechings. This leakage represented a loss in heat and reduced the chimney and induced draft fan drafts. The loss through the economizer by-pass dampers was particularly bad; when the draft in the breechings exceeded the draft in the by-pass flue to the chimney the chilled gas which had already passed through the economizer was recirculated through the economizer again. On the other hand when the stack draft exceeded the breeching draft, hot gases went around the economizer to the chimney. This alien gas reduced the temperature and increased the volume of the gas between the boiler and economizer resulting in lowered heat absorption, increased draft loss, excess load on the induced draft fan and a reduction of draft in

the flue. These conditions lowered the efficiency and capacity. These dampers were replaced with a type of roller curtain damper which prevents this undesirable leakage. These dampers are simple in design being a flexible curtain held in place against the sealing strips by the draft, this automatically producing a tight seal. The curtain is rolled up to open the damper and can be completely closed or left partially open as desired. The need for a close fit is eliminated and its operation is smooth and free, even if foundations settle or warp. The curtain dampers gives about 200 hp. additional capacity and 50° F. increase in temperature of the gases entering the economizer because of the elimination of pollution by alien gases.

Another way fuel was saved was by reducing the steam used in the boiler house itself. For instance, a more efficient steam jet ash conveyor system was installed which moved ash much quicker, used much less steam per hour and reduced maintenance on the conveyor system to almost nothing. This ash system incidently has a dustless unloader attached to its storage tank which keeps ashes from being scattered over the yards and buildings. Other savings were made by using air heaters to reclaim excess low pressure steam at times when it cannot be utilized entirely by the feedwater heater; and reducing the steam used for soot-blowing by always blowing the minimum amount necessary to keep the tubes clean.

Efficiency can be increased and cost reduced by the proper selection of coal. To take advantage of many types and sizes of coal available the coal crusher was rebuilt so it would crush to smaller maximum sizes. In order to burn degradations, excessive fines and byproduct fuels coal mixing equipment was installed so that different types of coal can be thoroughly mixed. In this way many coals can be burned successfully which cannot be burned efficiently by themselves, or cannot otherwise meet steam production needs when burned alone.

The coal storage piles were waterproofed by spraying an emulsion on them. This keeps the rain, ice, and snow out and prevents excess freezing in winter. The coating is air tight and helps to prevent fires and reduces losses while the coal is stored.

Superchargers

After making the changes and additions enumerated so far, it was thought that no greater steaming capacity from the present boilers and equipment could be obtained, even with a sacrifice in efficiency and with increased maintenance and more operating difficulties at the high rating being run. Without rebuilding the entire plant no practical way was known of increasing the ratings farther.

Then superchargers were investigated and experimented with and it was found that it was possible to substantially increase present steam production and efficiency by their use. They were installed on all furnaces in the Rothschild and Menasha Divisions, and are now being installed in the Menominee plant. The results proved most gratifying, satisfactory, and profitable.

The supercharger installation has unique blowers which deliver air at a pressure of about 30 inches of water, at a high efficiency over a wide range of working conditions. Thirty inches of air pressure is high pressure air in boiler room practice where prevailing fan designs deliver air at 4 to 6 inches pressure with a high of 8 inches. The blowers are small and compact in size, light in weight, and can easily be mounted around a boiler or can be hung on the boiler setting itself. No special foundation need be provided for them as they can be installed almost anywhere. They run without noise or vibration and are not easily affected by heat and dirt. The superchargers are controlled by electric-eye robots.

The superchargers introduce high pressure air to the furnace through a series of manifolds and nozzles. Each installation usually requires a different method, point of application, size of manifolds and nozzle arrangement to approach perfect results. Unfortunately there can be no standard design for all furnaces which would make engineering and installation simple.

Formerly steam jets were used over the fuel bed to try to stop smoking but they only white-washed the smoke and put in a small amount of over-fire air. The steam from the jets whirled the ashes around the furnace with little effect except to scour out the refractory, producing hot spots and reducing zones and building up slag in other places. Steam jets of any kind are unnecessary when superchargers are used.

Smoke can easily be eliminated completely or controlled at any desired density by the use of superchargers. The loss because of dense smoke seldom exceeds 1% of the carbon in the coal. However, the loss caused by accompanying combustible gases may be in the mounts of 3 to 10% hydrocarbons, etc. remaining unburned because of the lack of the proper mixture of air and gases at the proper temperature and at the right time and place. Low furnace temperatures can cause smoke and on the other extreme, high temperatures produce smoke and combustibles also.

Unlike other systems of over-fire air which try to create a turbulence in the furnace by whirling the gases in circles, this system creates turbulence by mixing the air with the fuel and flame travel. In this way the supercharger produces almost instantaneously complete combustion, not only of carbon monoxide, but other hydrocarbons, etc. which escape from most furnaces without burning completely. These unburned carbons which are usually not detected by the ordinary boiler room instruments ordinarily escape from the furnace in chemical combinations which do not give up the maximum heat available. With superchargers smoke and combustibles are completely burned and all stratification of gases is removed before they reach the boiler. This allows all parts of the boiler to absorb the maximum amount of heat, thereby lowering the outlet flue gas temperatures considerably and reducing their volume. This volume is further reduced by being able to get complete combustion in the furnace with much less excess air than is otherwise needed for more or less incomplete combustion common with most stokers and other types of firing equipment. A chimney, or chimney and induced draft fan of a given capacity, with superchargers installed will handle the products of combustion of more fuel than formerly because of the reduced volume of air needed per pound of fuel and because of a lower temperature of gases entering the stack.

Operators Data

In many cases of boiler test of short duration produce results which are not maintained in daily operation. Therefore the figures given are averages over periods of a month each, and include losses caused by shutdowns of the manufacturing plant, losses caused by taking boiler out of service and firing them up again on weekends, etc. In other words, these figures

are arrived at, at the end of each month and totals and averages are on that bases.

Before the supercharger installation, the peak load ratings were about 240% of normal. The highest average rating it was possible to obtain for a month's period was 175%. With the superchargers the peak load ratings are about 290% and the highest average rating for a month's period was 205%.

Boiler efficiencies vary with the ratings of the boilers. Without the supercharger the overall boiler furnace and economizer efficiencies were 81.5% when average ratings did not exceed 150%. At 175% of average rating the efficiency was 79%, or a drop of 2.5%. With superchargers the average monthly efficiencies are 83.5% when average monthly ratings do not exceed 175%. From 175 to 205% of ratings the monthly efficiencies now average 82%.

Superchargers save about 3% of fuel and reduce clinkering on grates and furnace walls. The range of efficient operation is considerably broader with supercharger. It is less difficult for the operators to make firing equipment produce and keep producing its maximum efficiency. There is much less combustible in the ash and the burning of lower ash fusion point coals than before, is possible with less operation difficulties. The burning rate of fuel per square foot of grate area was considerably increased. Fly ash was reduced about 50% and the combustible content of the fly ash was reduced. This reduced the load on the fly ash arrestors. Slagging of boiler tubes was reduced and less soot blowing is needed to keep the boiler surfaces clean. The over-feed stokers alone gave a fast steam pickup, but with over-feed stokers and superchargers together a steam pickup that approaches that possible with powdered fuel is obtained.

Mechanical equipment, controls, meters, etc. can be purchased and installed, which when synchronized properly can be made dependable and flexible; produce steam at high ratings, be highly efficient, and produce a low delivered steam cost. Unfortunately they will not continue to do so without attention and guidance. The mechanical, electrical and chemical equipment must be kept in good condition always, by inspection, adjustment, and repair, as often as necessary and convenient. By doing this most of the breakdowns and losses can be prevented before they begin. Accurate daily records must be kept of all operations and costs so that any loss can be immediately checked. The operating and maintenance personnel must be trained and supervised to be ever alert to prevent the elusive B.t.u. from escaping without doing its proper share of work.

Organization and Functioning of the Maintenance Department*

By George H. Pringle[1]

Abstract

This paper explains how the maintenance department should be organized showing the requirements of each supervisor and the various departments necessary within maintenance. It explains the records that should be kept by this department and how work orders should pass through it from the various departments in the plant. It shows how the work done should be checked as well as the repair materials taken from stores controlled. In conclusion, several points are brought out with reference to the functioning of this department within itself.

This paper applies particularly to a large book and specialty pulp and paper mill shutting down every Sunday or every other Sunday for repairs. With a few modifications, however, it should apply equally well to a small mill or a unit that operates through several months without a shutdown.

Organization

Paper is one of the few industries where, in a large number of mills, maintenance is under the direct supervision of the general superintendent instead of the plant engineer. In the author's opinion this is entirely wrong.

The general superintendent is responsible for the manufacture of pulp and paper and has sufficient production problems without the added responsibility of the maintenance department.

The plant engineer is, in most mills, in charge of engineering, steam power, electric power, and new construction. To this should also be added maintenance. All these departments, including maintenance, are utilities or services furnished to the main production units and should come under one supervision. The plant engineer, who should be an engineering graduate with considerable practical experience, is certainly well qualified to direct the activities of the maintenance department.

Directly in charge of maintenance, and reporting to the plant engineer, is the maintenance superintendent. The superintendent should be a graduate mechanical engineer with considerable experience in the pulp and paper industry and familiar with all pulp and paper mill equipment. He should also be a good organizer and have the proper personality for making satisfactory contacts with other department supervisors throughout the plant.

Working directly under the maintenance superintendent is the master mechanic who should be a qualified practical man not necessarily a graduate engineer. The master mechanic should be experienced in all phases of pulp and paper mill repairs, capable of handling men, scheduling jobs and supervising the work of the several groups under his direct supervision. The master mechanic is directly responsible for the work done by the machine shop, blacksmith shop, welding shop, millwrights, pipe-fitters,

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carpenters, riggers, and painters. Over each of these groups is a foreman reporting to the master mechanic. In some cases it may be desirable to combine the machine shop, blacksmith shop and welding shop under the machine shop foreman and the millwrights and riggers under the millwright foreman. One of these foremen, preferably the machine shop or millwright foreman, should be designated as assistant master mechanic and qualified to take charge in the absence of the master mechanic. Similarly, each of the other groups should have a senior, skilled man designated and qualified to take charge in the absence of the foreman. This procedure, in addition to arranging proper supervision for the various groups when the regular foreman is absent, provides an opportunity for foremen training and, when a vacancy occurs, there is a man qualified for promotion for it.

Instrumentation in the pulp and paper industry has increased very rapidly in recent years and it has now reached the point where every maintenance organization should have an instrument department. This department should be in charge of an instrument supervisor who preferably should be a graduate mechanical engineer who has had considerable practical experience with an instrument manufacturer. This instrument supervisor should report directly to the maintenance superintendent. The instrument department should be responsible for the installation, servicing and maintenance of all instruments, automatic controls, paper machine drying and condensate systems, consistency regulators, clocks, air conditioning equipment, and all similar types of apparatus. A man with watch repair experience is very valuable in this department and with proper training in instrumentation will be a good supervisor. This department should have necessary instrument repairmen, instrument repairmen helpers, and at least one skilled instrument pipe-fitter. This department should also have a separate shop for testing and repairing instruments and making up replacement parts when necessary.

Lubrication is, in a large number of mills, not given the consideration it warrants and there are more equipment failures because of lack of lubrication than from any other cause. Every maintenance organization should have a lubrication department in full control of and responsible for lubrication throughout the entire plant. This department should be in charge of a lubrication supervisor who preferably is a graduate engineer and experienced in all phases of lubrication. This lubrication supervisor is directly responsible to the maintenance superintendent.

In the maintenance office there is at least one despatcher, under the direct supervision of the maintenance superintendent. This despatcher takes care of all maintenance work orders, costs, record files, and other necessary clerical work.

Records

For the benefit of the accounting department, stores, as well as the maintenance department a complete break down of all the equipment in the plant should be made and account numbers allocated to each piece of equipment. This can be a comparatively simple system, for instance, the paper machines can be account No. 2000, No. 1 paper machine is account No. 2100, No. 2 paper machine is account No. 2200 etc. Following the same procedure the screens on No. 2 machine are account No. 2205, the fourdrinier section is account No. 2208, the press section is account No. 2209 etc. A further break down should be made of each section, for instance, No. 2 machine fourdrinier side rails and supports are account No. 2208-A, table rolls and bearings are account No. 2208-B, wire return rolls and bearings are account No. 2208-C etc. These account numbers are used by the accounting department, stores, and maintenance department in breaking down costs, material and labor charges and records.

In the maintenance department office files there should be a complete record covering all the plant equipment and filed according to account numbers as referred to above. This record should contain complete equipment nameplate data, detailed equipment prints, manufacturer and number of all antifriction bearings, V belts, detailed specifications of gears, shafting, pumps, etc. There should also be a cross index of this file showing where duplicate parts are used. This is particularly applicable to antifriction bearings and V belts and will reduce the spares necessary to be carried in stores.

In addition to this record it may be advisable to keep a separate card index file on pumps, reduction gears, antifriction bearings and V belts for ready reference.

Functioning

Maintenance work orders should be the duplicate type and should show account numbers and specify clearly the work to be done and when required. These work orders are made out by the superintendent or foreman in the department where the work is to be done and given to the despatcher in the maintenance office. These open orders are kept in racks in the maintenance office according to departments and, at any time, the superintendent, master mechanic, or foremen can tell the work ahead of any maintenance group by referring to these orders.

On shut-down work the management should insist that no maintenance orders are to be received after Friday noon prior to a Sunday shut-down except absolute emergencies. This will give the maintenance supervisors sufficient time to check all their shut-down work, materials required, and schedule their men so that there will be a minimum of lost time during the shut-down period.

The despatcher keeps a record of each man's time on each work order and when the job is completed obtains the material costs from stores and shows on the work order a total cost of the job. All completed work orders should be given to the maintenance superintendent who should check, on the job, the work done and the costs and, if possible, check personally with the supervisor who made out the order. If the work is not satisfactory or the costs are excessive he should call it to the attention of the master mechanic or supervisor and make sure that they in turn notify the workmen responsible in an endeavor to improve the efficiency of this department. The maintenance superintendent should add his comments to the work order, intial it, send the original to the department head where the work was done, and file the duplicate.

At least once a year the maintenance superintendent should review the maintenance costs of each equipment unit according to account numbers and should also compare these charges against previous years. This comparison will tell him at a glance any piece of equipment on which maintenance charges have been excessive and he can take necessary steps to correct it.

All spare mechanical equipment carried in stores should be clearly tagged. When any of this material is requisitioned by the maintenance department the storekeeper should refer these tags to the maintenance superintendent for his decision on reordering. In this way the maintenance superintendent has, at all times, full control of the spares carried in stores and the items taken from stores by his department.

Once a day, preferably around 1:30 p.m., there should be a short meeting of the maintenance department supervisory personnel. This meeting should be presided over by the maintenance superintendent and, if at all possible, the plant engineer should attend. At this meeting the work in progress can be discussed and the jobs to be worked on by the various departments the following day arranged. This meeting also provides an opportunity for discussion of any other maintenace problems.

Under existing conditions with most mills unionized and seniority prevailing it is very important that great care be exercised in selecting new employees for this department. The men taken into this department as helpers or apprentices should be young high school graduates and be required to pass a rigid intelligence test by the personnel department. These young men will be the future skilled mechanics and foremen of this department and every care should be exercised in selecting them.

Like all organizations, it is very important that the line of authority be rigidly followed when issuing any instructions. The maintenance superintendent should never issue any orders to the foremen but put them through the master mechanic or supervisors. This same procedure should be strictly adhered to down the line.

No attempt has been made to cover electrical maintenance in this paper as it comes under the electrical superintendent and is a separate department working under the plant engineer.

Relative Merits of 200, 400, 600, and 1200 Pound Pressure Plants For Steam And Power Generation*

By F. E. Laramore[1]

Abstract

It is indicated that the ideal situation for any power plant serving a pulp or paper mill is to be capable of generating the entire electric power requirement from the steam needed for process without recourse to steam condensers to force a balance. The various points to be considered are mentioned.

The purpose of this discussion is to set forth the relative merits of various operating pressures for power plants insofar as their application to the paper and pulp industry is concerned. In order to limit the range and to simplify the explanations which are to follow this paper will be confined to the following pressure and temperature ranges which are divided into four classes, i.e.:

200 p.s.i. gage, 600°F. T.T. (total temperature); 400 p.s.i. gage, 750°F. T.T.; 600 p.s.i. gage, 825°F. T.T.; and 1200 p.s.i. gage, 900°F. T.T.

The primary function of a power plant for a paper or pulp plant is to supply steam required for process and generate the electric power required for driving the various units employed in the process. However, in the design or selection of an operating pressure, the fuel cost, the labor available, and the investment costs also have a direct and vital bearing on each and every project, therefore, in order not to dwell on the economic aspects that may arise this discussion is confined to the basic differences to be encountered from an engineering viewpoint without specific application to any particular situation.

The ideal situation for any power plant serving a paper or pulp mill is to be capable of generating its entire electric power requirements from the steam needed for process without recourse to steam condensers to force a balance. This may not always be possible but in many cases this situation can be attained.

Steam Required for Process

The first step in the problem confronting any particular plant is to determine the amount of steam required for process and to determine whether or not this process steam can be reduced to a relatively few pressure categories or at least to confine these pressures to groups which can be used as bases from which the lower pressures in each group can be obtained through pressure reducing stations. This will then provide the basis for a study of possible balance between power and process. It is evident that if all the electric power requirements can be produced well within the range of the steam process load then the ideal situation has been attained.

The basis efficiencies of steam turbines used for generating power increase as the size of the units increase and decrease as the initial pressure increase. However, the theoretical efficiency increases with an increase in initial pressures and temperatures.

In order to illustrate the results that might be expected under different operating pressures and temperatures a definite size of turbine generator a 5000 kw. unit has been selected for comparison, which unit would be of a size used in a larger than average size mill. Fundamentally the same conditions will apply in a plant where the power requirements are greater or smaller.

To further fix the basis for comparison assume a process steam requirement of 10,000 pounds at 40 pounds gage for each ton of product. The amount of

* Presented at the meeting of the Technical Association of the Pulp and Paper Industry held at the Pfister Hotel, Milwaukee, Wis., Oct. 2-4, 1946.

[1] Laramore and Douglas, Inc., Chicago, Ill.

electric power required per ton of product will vary considerably depending on the amount of stock preparation and the finished product.

Using 200 pound gage and 600° T.T. it would be possible to generate 312 kw.hr. from each 10,000 pounds of steam being used for process at 40 pound, at 400 pound 750° T.T.—466 kw.hr., at 600 pound 825° TT.—551 kw.hr., and at 1200 pound 900° T.T. —642 kw.hr.

The exhaust temperatures will vary in each of the foregoing examples to some extent each containing some superheat, which may or may not be permissible for the process for which it is to be used.

In cases where process steam is required at higher pressures than indicated it can be secured by extraction. The electric load will in many cases be proportionally small enough to permit extraction at higher pressures without throwing the set-up out of balance.

Steam Producing Equipment

There are several other problems to be considered in fixing the proper operating pressure. These have to do with the steam producing equipment. Operation at low pressures entails no particular operating problems but as pressures are increased more attention must be given to maintaining proper feed water conditions for boiler feed. In the paper and pulp industry a considerable amount of steam may be used by direct application for heating process water, used in digesters, etc. This results in comparatively high make-up in the feed water cycle, which will require proper conditioning if boiler operation is to be held to high efficiency and low maintenance. The character of the make-up water may exert considerable influence on the selection of the operating pressure for any specific situation, not only from the standpoint of the investment required in feed water treating equipment, but, also, in the cost of operation and the ability of the operators to properly operate such equipment. Another factor that must be considered is what effect the treatment will have upon the use of stage heaters the use of which may be desirable in securing a balance between the process steam and electric loads.

The use of higher pressures may at first thought seem to entail considerably more investment. However this may not necessarily hold true if a complete analysis is made of the particular situation under consideration. It is true that high pressure boilers cost more but this increase in costs is confined to the pressure parts. If the proper pressure is selected to produce a proper balance between the steam and electric loads it will be found in many cases that the condenser can be eliminated entirely permitting additional expenditure for high pressure equipment such as boilers, turbines, piping, etc., without increasing the overall costs.

The cycle of operation for each particular situation must be thoroughly analyzed to determine the steam and electric requirements during periods of production and down periods and the duration of each period.

Satisfactory balance may be obtained during the operating period with practically no chance of balancing on down or nonproductive periods. However, sufficiently better balance may be obtained during the production period to completely outweigh any disadvantages that occur during nonoperating or down periods. In such cases very little investment can be justified to secure efficient operation for the down or nonproductive time.

If a mill is considered, for example, that is in operation three hundred 24-hour days during the year with down time equivalent to sixty-five 24-hour days then it can readily be seen that if by adopting a cycle of operation that is the most efficient that can be secured for the operating period that the efficiency of operation during the down period will not be a controlling factor because the requirements for both steam and electric power are at a minimum during these periods. Many mills operate on a considerable higher ratio than cited in the foregoing example.

It will be found in almost every case that the operating pressure and temperature selected should be based almost solely on the conditions that must be met during the operating period, even though this may require additional auxiliary equipment that is used only during the non-operating periods.

The steam pressures required for process in any particular situation will have a direct bearing on selection of the initial or generating pressure. It may be found that it will be more economical from the standpoint of first cost as well as provide a more satisfactory operating condition if corrections are made in the process equipment so that relatively large quantities of the process steam can be used at the lower pressures. Improper application or wasteful use of process steam will offset the efficient production in the power plant. Interest is not in the efficiency of the power producing plant but rather in what is the minimum amount of steam and electric power necessary to produce each ton of product.

In summing up the various points which have been covered in the foregoing discussion the principle item is indicated which will in each case govern the selection of the proper operating pressure. These are as follows:

1. The amount of process steam required per ton of product.
2. The pressures at which the process steam must be supplied.
3. The amount of power required per ton of product.
4. The cost of fuel.
5. The character of the feedwater make-up.
6. The ability of the operators to handle high pressure equipment.
7. The investment required, which item, will be governed by the cost of fuel.

It is believed that the application of process steam and power is just as important as its production, therefore, the complete cycle must be analyzed in each case before a selection is made of the proper pressure to use.

New England TAPPI To Meet

The New England Section of the Technical Association of the Pulp and Paper Industry will hold their first meeting of the season October 18th at the Hotel Roger Smith, Holyoke, at 6:30 P.M. Following the dinner, Dr. John Pollard of the American Cyanamid & Chemical Company will present a paper on the Fundaments of Cellulose Chemistry, which will be followed by a talk on the Continuous Preparation of Fibers for Textiles by Ralph L. Carr of Mathieson Alkali Company. Mr. Carr will present a motion picture in conjunction with his talk. The first three meetings will be devoted to a study of rags and rag cooking.

Supertherm Heating System*

By Steven Senko[1]

Abstract

High pressure hot water is drawn at steam saturation temperature from any industrial boiler of standard make and is circulated through a completely closed pipe system by means of a pump of special design. It returns directly to the boiler after giving up the required amount of B.t.u. to the heat consumers. No traps, pressure reducers or separators are used. The mains are welded throughout conforming to the most modern engineering principles. Radiation is the only loss that occurs, and the efficiency of the heat transporting mains for water compared to steam is often increased from 10 to 20%.

A system now installed and a water treating plant are described.

No manufacturer today questions the paramount importance of production costs as one of the major factors in the successful operation of his business yet it is amazing to see how many plants continue to operate inadequate and even antiquated heating systems that cannot fail to exert a detrimental influence upon the price and the quality of the goods produced.

There are also many progressive manufacturers paying out large sums of money in order to squeeze the last per cent of efficiency out of their boiler house.

Simply because one group of people uses a given product as a panacea for all their ills, does not necessarily prove that the product or method is the right one for the purpose. The same observation can be made in the manufacturing and engineering field, where unfortunately the use of steam has become almost universal, entirely without due consideration of thermal efficiency and its reaction upon treated goods.

True, steam is a most suitable carrier of energy, and the last years of progress and accomplishments in power plant design are little short of marvelous.

Unfortunately, the latter cannot be said of manufacturing processes using heat. The fact that compressed steam furnishes its own propelling energy when flowing from a higher to a lower state of pressure, accounts mainly for its popularity in heating practice.

In the times when fuel prices were low, few manufacturers worried about such things as heat balance, condensate return, flash losses, etc. But today the situation is different; competitive conditions have changed; it is now extremely important to reduce costs, to improve the product in order to get business and thereby to keep the plant busy.

Supertherm System

High pressure hot water is an ideal heat carrier and heat accumulator and is readily obtained from any industrial boiler. All the British thermal units that saturated steam carries have originally been extracted from water, which at 212°F. and equal volume has a 250 times greater heat content.

The most effective utilization of superheated water is achieved with making use of all the physical advantages which water can offer for process heating. It gives to the plant a completely closed, welded pipe system from the source of heat to the user and back. All possible losses of heating fluid and condensate flash-off are definitely eliminated and no traps, pressure reducers, separators, or other troublesome accessories are needed.

Consider the fact that there is hardly a steam heated factory that does not feed 10, 20, or 30% of make-up water to the boilers with 50 to 60% make-up quite frequent. There are even cases today where no condensate at all is returned to the boiler house. Just how many of the older mills have a complete blue print record of their steam mains, and how many of their traps discharge into sewers or to the atmosphere are questions that perhaps can never be answered, but the facts are there. Fuel is being burned to make up for wasted heat, and the fuel bills rise accordingly.

Whenever steam is used in a large establishment, or in a number of scattered buildings, the long distance transport of heat as well as the return of condensate present difficult problems.

Everyone knows that the steam temperature is a function of its pressure. Therefore, important temperature losses are observed whenever the steam pressure decreases along the mains. Of course, the pipe sizes can be increased in order to avoid decided pressure drops, but the cost of installation and magnified radiation losses make this procedure highly unsatisfactory.

Long distance heat transport with superheated water is effective and simple and does not necessitate excessive pipe diameters. For reasonably large pipe, say 6 inches, the loss in temperature is generally less than 3°F. per mile of conduit. This is one reason why high pressure hot water has been so successfully applied to district heating.

* Presented at the meeting of the Technical Association of the Pulp and Paper Industry held at the Pfister Hotel, Milwaukee, Wis., Oct. 2-4, 1946.

[1] The Personal Products Corp., Milltown, N. J.

FIG. 1
Boiler Under Construction.

Furthermore, while all steam installations require pipes to be pitched and special care taken to eliminate the condensate, Supertherm water pipes may be installed in any way and position as long as free thermal expansion is assured. Pipe radiation remains practically the same for equal pipe sizes, equal covering, and identical temperatures for water and steam. It is, however, frequently possible to use smaller pipe diameters when applying the Supertherm System.

As mentioned above, the return of condensate is another problem and the difficulties increase when long distances are involved. Special return pumps, hot wells, etc., are absolutely necessary and their performance is often poor. In fact, these difficulties prove so troublesome that some large district heating plants do not bother to return the condensate.

When steam is condensed at a certain pressure, e.g., 100 pounds, the condensate obtained will have the temperature of saturated steam, or in this case, 338°F. The heat content of water at that temperature is 309 B.t.u. per pound, or 309 — 180 = 129 B.t.u. more than at boiling temperature. This surplus of heat will be liberated in the form of steam when the pressure is released to atmospheric. The venting of hot wells, therefore, produces a double loss; a loss of B.t.u. and a loss of distilled water, and the deficiencies in both will have to be made up in the boiler house.

Many engineers refuse to acknowledge a heat loss in their condensate return system inasmuch as they use feed water heaters absorbing the B.t.u. returned from the plant. The loss usually exists, nevertheless, though no steam may escape to the atmosphere. The very fact that the make-up water must be heated indicates conclusively a loss in B.t.u., unless every single heat unit of the steam has been absorbed by the users. This, however, is never the case, as leaks through traps, by-passes, and vents can always be found to aggravate the inefficiency of the system. Plant engineers will tell that it is hard to keep a heat balance in the feed water heater and that some steam is generally "vented" during the summer months. As steam is a colorless vapor, and becomes partly visible only when condensing in air, it is difficult to judge by eye the importance of leaks through vents, traps, etc.

All these shortcomings of a steam system to which reference has been made are easily averted when Supertherm is applied. The water level in the boiler stays constant, and operating the feed water pump is seldom necessary. It may also be pointed out that water and steam can be drawn from the boiler at the same time and, best of all, the cost of maintenance of a Supertherm high pressure hot water installation is practically nil.

Supertherm System Installation

The power plant consists of two boilers each rated at 43,300,000 B.t.u. at 200% rating. There are three mains consisting of a 10-inch main which is rated at 110,000,000 B.t.u. per hour, an 8-inch main rated at 64,000,000 B.t.u. per hour, and a 5-inch main rated at 19,000,000 B.t.u. per hour all based on an 80°F. drop. There are five pumps each rated at 180,000 pounds per hour.

Power plant instruments consist of flow meter plus temperature recorders, recording water leaving and returning.

Boiler house costs for a period of seven months to July 31 of 1946 are $79,105. Boiler horsepower was 3,829,401; average boiler efficiency, 84.69%; fuel in-put was 1,911,700 pounds of coal and 868,424 gallons of oil or making a fuel cost of 36 cents per million B.t.u. Other fixed charges such as labor, repairs, maintenance, supplies, taxes, and depreciation bring the unit cost up to 62.5 cents per million B.t.u.

Paper mill steam to the Yankee driers is supplied by two steam generators each rated at 7,000 pounds of steam per hour which are connected to the Su-

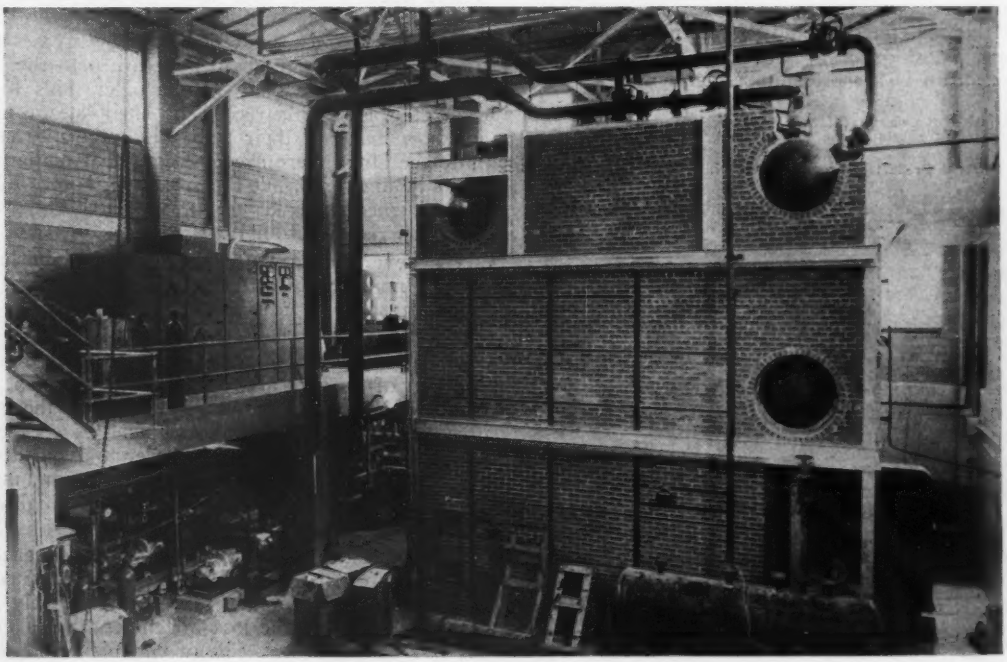

FIG. 2
Boiler Showing Supertherm Piping.

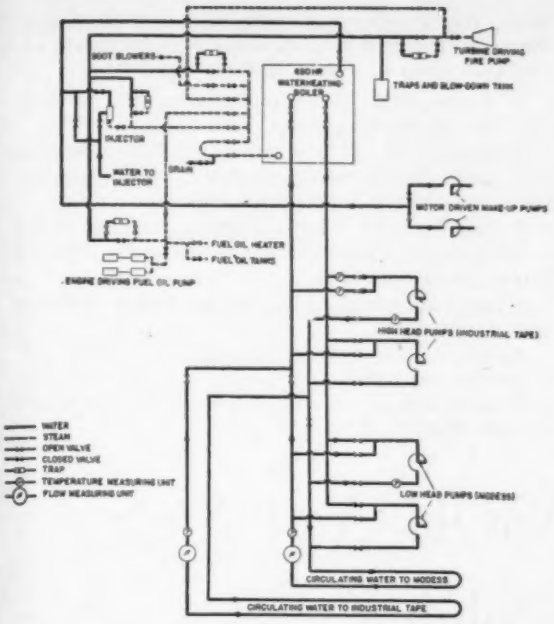

FIG. 3
Piping Diagram.

pertherm System. The rest of the paper mill is directly connected to the Supertherm System as shown in Fig. 3.

All pressure and temperature controls are Brown pneumatic type with built-in recorders.

Conclusions: The point arrived at from the foregoing discussion is that, while steam is successfully used for the production of mechanical energy, no hasty conclusions should be drawn as to its advantageous application in process heating.

Water Treating Plant

Water for process and sanitary purpose comes from a 1 million gallon per day filter plant. Equipment consists of one accelerator design for 700 gallons per minute and two 180 square feet of gravity type sand filters. Water flows from the filters to a 100,000 gallon clear well, pumps feeding the distribution system force the clear well water through, 2,350 gallons per minute, activated charcoal filters and zeolite softeners, pumps operate on control actuated by distribution pressure.

Raw water comes from a city reservoir, which mainly is surface water.

Following are typical analyses:

Total hardness, p.p.m.	25	40
Color, p.p.m.	110	200
Turbidity silicate, p.p.m.	5	15
Alkalinity to methyl orange, p.p.m.	5	10
Iron, p.p.m.	1.5	3.0
pH	4.5	6.0
Water leaving accelerator entering filters.		
Total hardness, p.p.m.	25	40
Color, p.p.m.	5	15
Turbidity, p.p.m.	0	10
Alkalinity, p.p.m.	8	10
Iron, p.p.m.	0.5	
pH	5	6
Water leaving filters to clear well.		
Total hardness, p.p.m.	25	40
Color, p.p.m.	0	5
Turbidity, p.p.m.	0	
Alkalinity, p.p.m.	45	55
Iron, p.p.m.	0.1	
pH	7.3	80
Water leaving charcoal filters and zeolite softeners.		
Hardness, p.p.m.	0	
Color, p.p.m.	0	
Turbidity, p.p.m.	0	
Alkalinity, p.p.m.	45	55
Iron, p.p.m.	0.1	
pH	7.3	7.8

Chemical demands to the accelerator varies. Alum

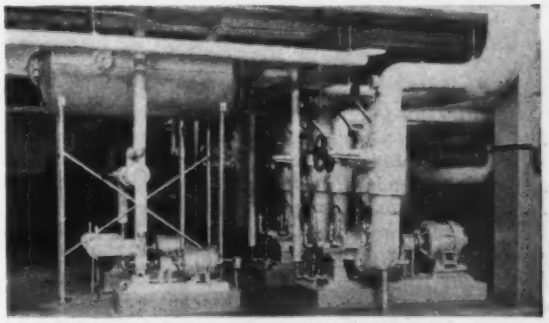

FIG. 4
Boiler Feed Pumps and Supertherm Pumps.

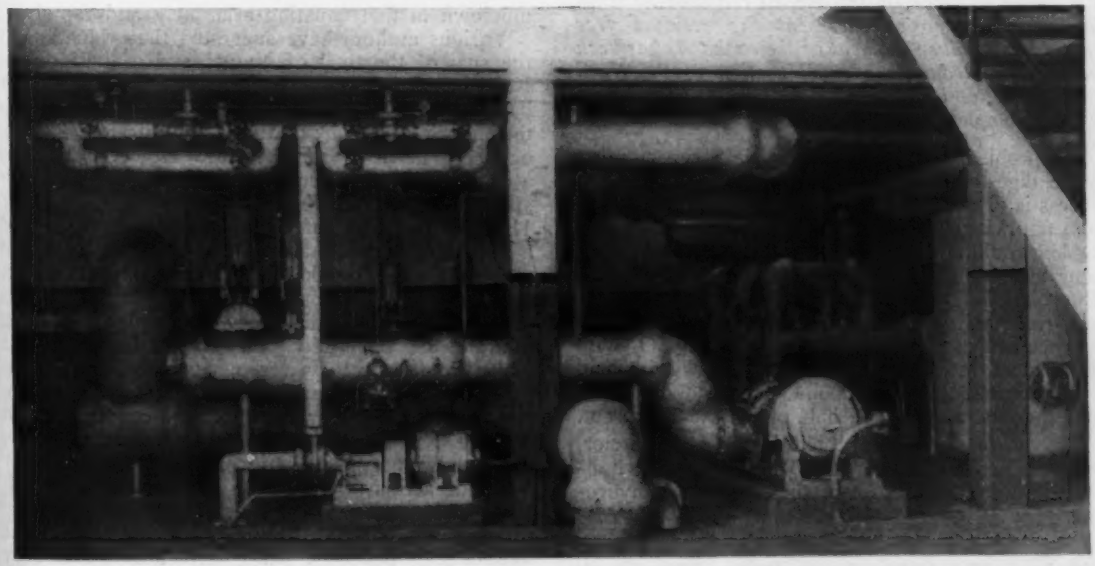

FIG. 5
Water Filter Controls and Pumps.

2 to 4 grains per gallon, soda ash 1 to 2 grains, silicate 5 to 10 p.p.m. and chlorine 5 to 10 p.p.m.

Soda ash is fed to the clear well at the rate of 2 to 5 grains to maintain a pH of 7.3 to 8.0.

Filter operating cost over a period of seven months per 1,000 gallons were:

Raw Water	.020
Alum	.0045
Soda ash	.0068
Chlorine	.0032
Salt	.0019
Silicate	.0011
Bicarbonate	.0003

Other charges such as labor, repairs, depreciation, and taxes make a net cost of 0.1135 per 1,000 gallons of treated water.

While steam is successfully used for the production of mechanical energy, no hasty conclusions should be drawn as to its advantageous application in process heating. Superheated water will, in most cases, give a better plant efficiency, and the Supertherm System will furnish many manufacturing advantages when diligently applied such as:

1. A completely closed pipe system that prevents any loss of steam or water.

2. Elimination of traps, pressure reducers, separators, and other accessories subject to frequent repairs and causing heavy steam losses.

3. Temperatures are not a direct function of the boiler pressure and therefore they can be adjusted to suit plant conditions.

4 Large accumulation of heat which can overcome peak loads easily.

As process heating is only a means to a certain end, it should be designed to secure a high efficiency, to demand little or no maintenance, and to be simple in operation.

Consumption Of NaOH And Na_2S In Kraft Pulping*

By P. B. Borlew[1] and T. A. Pascoe[2]

Abstract

In order to determine the NaOH and Na_2S content of sulphate black liquor samples it is suggested — in analogy to white and green liquor analyses — to precipitate with $BaCl_2$ and to titrate the supernatant liquor potentiometrically with acid to an arbitrary endpoint not lower than a pH of 10.0. All the evidence points to the fact that the total NaOH and half of the Na_2S content of the sample is neutralized at such an endpoint. An argentimetric potentiometer titration provides the correct answer for the Na_2S content. The values obtained for NaOH contents of the samples at titration endpoints of pH = 11.0, 10.0, and 8.25 were plotted against the cooking time. The resulting curves represent the residual free NaOH at any given moment of the cook. As has been previously stated only a small portion of the Na_2S is consumed, while the free NaOH disappears sooner or later completely.

The problem of NaOH and/or Na_2S consumption in the digester of the sulphate pulp manufacturing process is of importance from a theoretical as well as from a practical point of view. A solution of that problem could not be expected as long as a rapid and accurate determination of NaOH and Na_2S in sulphate black liquor was lacking.

In green and white liquor NaOH is determined in presence of Na_2S by precipitating the Na_2CO_3 with $BaCl_2$ and titrating the supernatant liquor with acid to the phenolphthalein endpoint. This endpoint indicates the total NaOH and half of the Na_2S present.

This procedure is not applicable to black liquor, first because of the difficulty to find a suitable indicator, and second because of the presence of hydrolyzable salts which can not be removed by a $BaCl_2$ precipitation. These salts hydrolyze during the titration and the amount of measured standard acid consumed ostensible to neutralize free NaOH does not represent the value sought and does not convey a true picture of the NaOH consumption in kraft cooking.

However, it is obvious that if a way was found to determine the neutralization of the free NaOH and of half of the Na_2S in a manner analogous to white and green liquor analyses it would be easy to compute the amount of free NaOH. The argentimetric potentiometer titration as proposed recently by the authors *(1)* enables one to solve the monosulphide unknown in that equation accurately and rapidly.

Various authors have suggested the evaluation of the sum of the total of NaOH and of half of the Na_2S or of the active alkali in sulphate black liquor by titration with standard acid solutions determining the endpoint either by means of an indicator *(2, 3, 4)* or electrometrically *(5, 6, 7, 8)*. However, there is a considerable divergence of opinion as to what constitutes the endpoint. Schwabe proposed a pH of 11.00, Oeman a pH of 10.00, and Basberg suggested a pH of 8.8. These discrepancies may be explained to some extent by the fact that although they attempted to determine the proper endpoint in accordance with results which they obtained by titrating mixtures of chemically pure standard solutions of NaOH and Na_2S they were not unanimous in selecting the kind and quantity of other sodium salts to be admixed in order to approach conditions that actually exist in sulphate black liquor. Some of the studies did not take into consideration a possible buffering action of some salts such as sodium resinates, -mercaptids, -silicates, -sacharates, -phenolates, -thiolignates, etc. The buffering action of various sodium salts has been particularly demonstrated by Oeman *(2)* and Heath *(3, 4)*.

Despite these difficulties the authors present a

* Presented by title at the Fall Meeting of the Technical Association of Pulp and Paper Industry, Roosevelt Hotel, New Orleans, La., Oct. 14-16, 1946.

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[2] Member TAPPI; Technical Diretcor, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

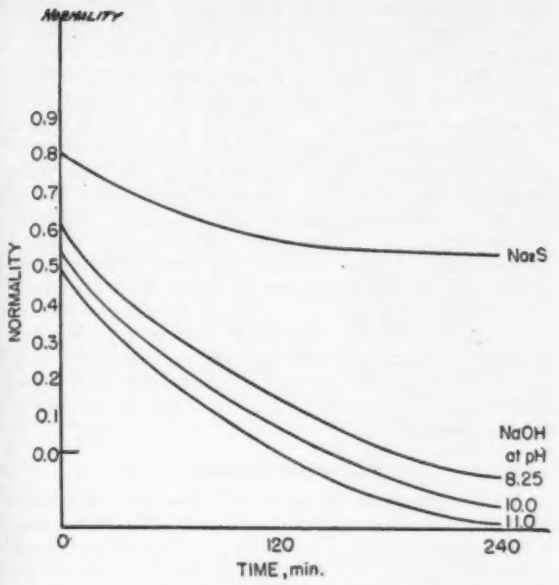

FIG. 1

Concentration of Na_2S and NaOH in Sulphate Black Liquor During a Mill Scale Cook

practical and workable solution of the analytical problem without deciding upon a definite endpoint by tentatively accepting several endpoints for the investigation of the NaOH consumption and for establishing such curves as would indicate residual free caustic at any given moment of the cook. However, the authors feel for such reasons as a cloudy appearance of the liquid and escaping odors if titrated below a pH of 10.0 that the endpoint of the titration as suggested here should not be selected in a region lower than pH = 10.00. In order to eliminate as many obstacles as possible the proposed method is based on a potentiometric titration of the free NaOH in the supernatant liquor from a $BaCl_2$ precipitated black liquor sample. The authors are well aware of the fact that some losses occur through occlusion of the otherwise titrable NaOH in $BaCO_3$ and in other barium salts. The advantages of a $BaCl_2$ precipitation obviously outweight any disadvantages as carbonates, sulphites, resinates, oxalates, and salts of some other organic acids, etc., are removed. Further, there seems little doubt that the application of a potentiometric method is a decided advantage over any conductometric analysis *(9, 10, 11, 12)* in respect to time, lack of complications, and accuracy.

Method and Apparatus

In detail the proposed method consists of the following steps: (a) A potentiometric determination of Na_2S as described by the authors previously *(1)*. Since publishing that paper the Na_2S determination has been simplified as it has been found unnecessary to especially prepare the AgS/Ag coated electrode in the laboratory. A commercial type is available (e.g. Beckman No. 1281X6 with phone tip) and has proved very satisfactory. A sample of 25 ml. black liquor was found to be sufficient in the current investigation.

(b) Another 25 ml. sample of black liquor is pipetted into a 250 ml. flask containing about 200 ml. of a 20% $BaCl_2$ solution, filled to the mark, well mixed, and the contents centrifuged. The amount of sediment is proportional to the $BaCO_3$ formed and increases as the cook progresses. The supernatant, clear, reddish liquor is transferred into another 250 ml. flask, made up to volume. One hundred milliliters are pipetted out and diluted with 100 ml. distilled CO_2 free H_2O and titrated with 0.5 *N* HCl to the pH levels of 11.00, 10.00, and 8.25 respectively using a high sodium glass and a calomel electrode and a standard laboratory Beckman potentiometer arrangement. The standard acid consumed is noted at each of the three pH levels. The values obtained in both titrations (a) and (b) are converted to milliliters standard solution per liter black liquor. The values for free NaOH are found by subtracting half the number of milliliters normal $AgNO_3$ computed from titration (a) from the number of milliliters normal acid as computed from each of the three titrations in (b). Surprisingly those values are fairly close together and the curves resulting from plotting these values against the cooking time appear to run very nearly parallel.

Presentation and Discussion of Results

From the numerous cooks investigated three typical examples are presented graphically. The concentrations of Na_2S and NaOH are plotted against cooking time. Figure 1 represents the conditions in a 4-hour cook on a mill scale. In view of the fact that in calculating the normality it is difficult to compensate for the wood moisture and the steam constantly escaping with the relief gases the results can not be considered absolutely correct. However, the results were in principle confirmed by experimental cooks of 3,000 grams moisture-free wood (Jackpine) in 11.4 liters liquor under rigidly controlled conditions with the results shown in Figs. 2 and 3. Figure 2 represents a 2-hour experimental cook of a regular caustic charge and Fig. 3 a 4-hour experimental cook with a 50% increase of caustic over the normal charge, the dilution ratio being equal in both cases and the sulphide charge approximately constant. The values for the initial cooking liquor are based on the NaOH + Na_2S content of the mixture of white and black liquor as supplied to the digester. In order not to disturb the liquor concentration of the cook at a given time the curves were constructed from points

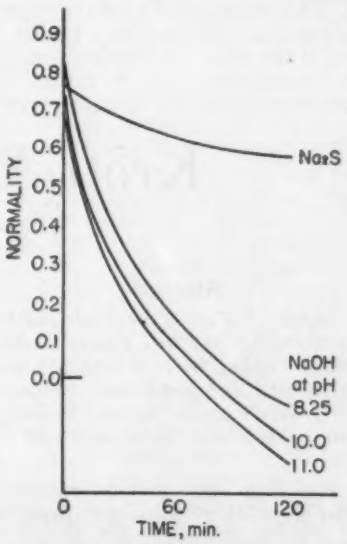

FIG. 2

Concentration of Na_2S and NaOH in Sulphate Black Liquor During an Experimental Cook

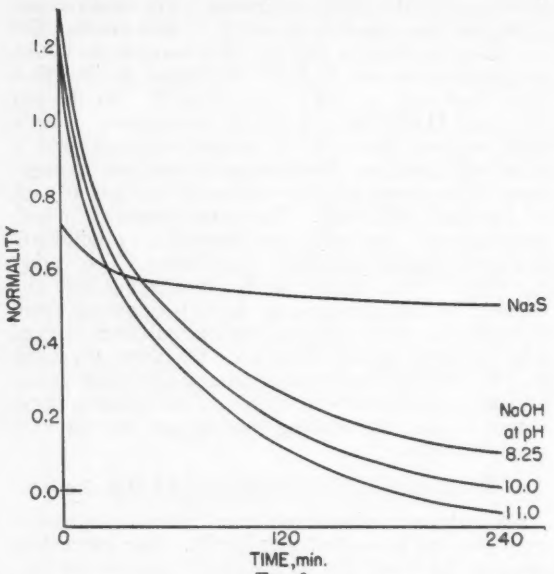

FIG. 3

Concentration of Na_2S and NaOH in Sulphate Black Liquor During an Experimental Cook

representing samples obtained from individual cooks in which the cooking time was some predetermined fraction of the 2- or 4-hour cooking periods.

In discussing the results it is apparent from all three figures that only a fraction of Na_2S is consumed, a result which confirms previous findings *(1, 13)*. This fraction is the smaller the stronger the NaOH in the initial cooking liquor. Or, it might also be stated, that if the required ratio of NaOH to wood is not up to the 14% found by Mitchell and Ross *(14)* or if the concentration of NaOH falls below a certain minimum the consumption of Na_2S increases. The bulk of the Na_2S consumption occurs in the early stages of the cook and almost ceases from then on. This apparently is also true for the NaOH, with the exception that the consumption of NaOH never ceases but goes on until all of the NaOH is consumed. The course of the consumption is paralleled from a certain point on with a tendency towards degradation of the freed cellulose resulting in a lower yield and bleachability. The fact that the caustic values even attain a negative character can be interpreted in the direction that the lower the pH of the black liquor due to its impoverishment in NaOH the higher the dissociation of Na_2S which means chemically that at the selected endpoints when there was no free NaOH the consumed milliliters normal acid neutralized a greater portion than half of the Na_2S.

In interpreting the above results for practical purposes one would, however, have to be cautious with respect to the possible presence of polysulphides in the initial cooking liquor *(2, 15, 16)*. The potentiometric titration as applied here indicates only sodium monosulphide. The authors are now investigating analytically the rather critical situation of determining polysulphides in the presence of monosulphide in kraft cooking liquors and hope that in applying the method of selectively transforming polysulphides into thiocyanates in the presence of sulphides and thiosulphates *(17)* some light may be shed on the problem in question.

Acknowledgement

Acknowledgment is made of the assistance rendered by a number of the Technical Staff during this investigation. The authors are grateful to Nekoosa-Edwards Paper Company for permission to publish the information.

Literature Cited

1. Borlew, P. B., and Pascoe, T. A., *Paper Trade J.* 122, No. 10: 31-34 (1946); *Tech. Assoc. Papers* 29 (1946); *C. A.* 40, 2625 (1946); *B. I. P. C.* 16, No. 8: 326-7 (Apr., 1946).
2. Oeman, Erik, Massanalytische Verfahren, Chapter IV, p. 86-97, Verlag von "Zellstoff und Papier," Berlin (1928).
3. Heath, M. A., *Tech. Assoc. Papers* 16, 153-156 (1933).
4. Heath, M. A., Bray, M. W., and Curran, C. F., *Tech. Assoc. Papers* 17, 447-51 (1934).
5. Stevens, R. H., and Wooldridge, R. C., *Paper Ind.* 15, No. 5: 256-257 (Aug., 1933).
6. Neiman, R., Kargin, V., and Fokina, E., *Org. Chem. Ind. (U.S.S.R.)* 1, 611-616 (1936); 3, 490-500 (1937); *C. A.* 31, 1201, 7644 (1937); *Cellusechemie* 17, 16 (1936); *C. A.* 30, 2752 (1936).
7. Schwabe, K., *Wochenblatt für Papierfabrikation* 67, No. 49: 926-9 (Dec. 5, 1936); *B. I. P. C.* 7, p. 136 (1936-1937).
8. Basberg, A., *Svensk Papperstidn.* 44, 441 (1941); *C. A.* 36, 6799 (1942); *Papir Journalen*, Vol. 29, p. 99-104, 109-114, 119-124 (1941).
9. Venemark, E., *Svensk Papperstidn.* 41, 406-11 (1938); *B. I. P. C.* 9, 61 (1938-1939).
10. Whittemore, E. R., Aronovsky, S. I., and Lynch, D. F. J., *Tech. Assoc. Papers* 22, 609-616 (1939).
11. Crocker, G. J., Dow, L. A., Ripanti, N. F., and Nolan, W. J., *Tech. Assoc. Papers* 25, 497-504 (1942).
12. Moetzau, D. R., *Tech. Assoc. Papers* 25, 391-395 (1942).
13. Mitchell, C. R., and Yorsten, F. H., Forest Products Laboratory of Canada, Pulp and Paper Quarterly Review, No. 19: 6-16 (July, 1934).
14. Mitchell, C. R., and Ross., J. H., Forest Products Laboratory of Canada, Pulp and Paper Quarterly Review, No. 15: 7-11 (October, 1933).
15. Woodside, V., *Tech. Assoc. Papers* 28, 191-193 (1945).
16. Woodside, V., MacMahon, J. D., and Vincent, G. P., *Tech. Assoc. Papers* 28, 347-348 (1945).
17. Schulek, E., *Zeitschrift f. analytische chemie* 62, 340 (1923); *Chem. Zentr.* 93, 188 (1923); IV, 65, 352-8 (1925); *C. A.* 1829 (1925).

Kraft Mill Maintenance*

By William McIntosh, Jr.[1]

Abstract

The development of alloy materials has helped tremendously to reduce the lost time and maintenance in kraft mills. Various units in which these materials have been utilized are mentioned. Minor changes, spare parts properly assembled and located, and adequate planning are also necessary for economical operation.

Maintenance in a kraft mill is fundamentally the same as in any other pulp and paper mill; the principal difference being in the kinds of material used to withstand the alkaline liquors. Mills can be operated with nothing but cast iron, steel, and brass, as indeed they were in the earlier days, but with the development of better alloys, it is more economical to use certain alloys on some jobs. This is especially true now that labor and material prices have advanced in the past few years. This paper will cover principally the pulp mill.

Use of Alloys

In the wood yard, most of the Southern mills are using a combination type chain for conveying wood with about as many different kinds of attachments and drives as there are mills. Adequate water

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lubrication materially increases the life of the chain and the wear plate in the conveyor. Care has to be exercised not to wet the bark too much, however, and thereby reduce its fuel value. Where water is used for lubrication, the water and/or the acid formed by the bark will etch the hardened pins and cause excessive pin breakage before the barrel links wear out. Zinc or cadmium coated pins under such conditions, will materially increase the life of the chain. An automatic finger type switch, just back of the drive sprockets on the return side of the chain, to stop the motor when the chain breaks, will reduce lost time when a chain break does occur. The tremendous pounding a barking drum gets from the tons of wood passing through crystallizes the steel in time. The tighter a drum is kept during operation, the longer the crystallization is delayed. Wood should be admitted to the drum in such a way that it falls principally on the wood and not on the drum shell, otherwise the shell at the intake end will crystallize prematurely.

Digester Room

In the digester room, more and more corrosion resistant materials are coming into use. As yet, no stainless clad digesters are known to be in use on southern kraft. A stainless clad digester would cost probably twice as much as a carbon steel digester. The cladding, however, would take the place of any metal allowed for corrosion and the carbon steel would only be the thickness required for the pressure, with of course, the usual factor of safety.

When building up a corroded carbon steel digester, a satisfactory job can be done by using Fleetweld No. 5 rods or equal, preheating the work and peening the weld when completed. In preheating, the use of Tempilstiks, or equivalent, has been found very useful. These sticks are somewhat similar to a colored chalk stick and can be bought for various temperatures. The metal to be preheated can be marked and when the proper temperature is reached, the chalk mark turns black. If put on a surface at or above the temperature printed on the stick, it will show as a liquid smear. This procedure, followed by peening the finished weld, gives a satisfactory job and is worth the extra time involved. A good many types of blow valves are in use. The use of alloy steel in any type blow valve will extend its life.

For blow lines, the general practice is to use steel pipe; some mills using double extra strong pipe. The drilling of weep holes in the blow line, particularly in the bends, will help to give advance notice when replacements are needed.

In the cyclone and blow tank, a stainless steel or stainless steel clad wear plate cuts down on carry over and maintenance. A plate too thin, however, will give trouble from vibration and breathing.

Diffusers

In diffusers, the greatest trouble is caused by pitting, which no doubt is an electrolytic corrosion. This type corrosion is also found in cyclones and in some liquor piping. Electrolytic corrosion would make an excellent subject for a paper at some future meeting. Observation has indicated that this type of corrosion occurs generally where a container is subjected alternately to black liquor and white water, fresh water, steam or condensate.

A Monel screen plate in diffuser bottoms definitely reduces the fiber loss because of less frequent failures and reduces maintenance.

A liberal use of ailoy metal on pulp washers will be found to be quite an advantage in the long run as down time on a washer drum will generally affect production a great deal more than taking one diffuser out at a time for repairs.

Evaporators

There is quite a wide variation, from mill to mill, in the life of carbon steel tubes in 1A and 1B evaporator effects. Most mills, however, have obtained such short life that stainless steel tubes have been installed. Some mills have also installed stainless tubes in the No. 2 effect. Stainless is very satisfactory and no failures are yet known. A stainless clad tube sheet must be installed when the stainless steel tubes are put in for otherwise the tube sheet will fail in a few years. Cladding parts of the dome and steam chests will eliminate a major job every few years. While the tube life in the other effects is good there is a need for a tube that will not scale up so easily. This scaling reduces the heat transfer and requires more time for boiling out. One suggestion which has not yet been completely investigated is carbon steel tubes, chromium plated on the outside.

A gradual replacement of the liquor lines around the evaporator with stainless steel, and possibly the cast iron fittings with Ni-Resist fittings, will in the end reduce maintenance and down time for repairs.

Alloy pumps in the evaporator room will also help considerably to reduce down time and maintenance.

For evaporator surface condensers, carbon steel tubes, chromium plated on the outside have been found very satisfactory.

In the recovery room, the dissolving tanks should be lined or they will have to be replaced every few years. A special grade of brick has been found satisfactory for this. Some have been lined with concrete or a hard burned common brick. For concrete or mortar used in white or green liquor, a mixture of half Portland and half Magnolia cement has been found better than all Portland.

A propeller type agitator that will give adequate agitation is much better than the older drag type agitators. They are less apt to be damaged by lumps, brick, etc. Alloy pumps for feed pumps, pump-out pumps, and circulating pumps materially reduce maintenance.

Clarifiers

In the caustic room, the life of the clarifier trays varies quite a bit from mill to mill. While several attempts have been made to work out a combination of materials to extend the life; no really satisfactory solution is known. Stainless or Monel no doubt would do the job but would be an expensive installation. The amount of entrained air that goes in with the liquor no doubt has a direct effect on the tray life.

Flow boxes for the clarifiers, lined with cement, have proved very satisfactory. The cement must be well anchored to the metal box by welding nuts, etc., to the steel. 1½ to 2 inches of cement is ample. Stainless or Monel sleeves must be used for any piping through the lining otherwise the cement will have to be broken out to renew the pipe. A sleeve can be made out of 10- or 12-gage sheet and a steel flange made and welded on. From the flange, any kind of pipe desired can be used. A cement lining in the slakers and retention tanks is necessary if not made of some corrosion resistant material. A chilled

iron plate at least half the diameter of the tank should be installed under the agitator, otherwise the grit will abrade the cement bottom in short order. The size of the plate will depend on the type agitator. Troughs, etc., around the classifiers and retention tanks can well be made of clad material. Alloy pumps from the retention tanks will materially reduce the maintenance at this point. If the causticized liquor does not have a retention period befor it is pumped, a great deal of trouble will be experienced with the lime building up in the pumps and pipe lines. On the other hand, if the reaction has been more nearly completed, very little trouble will be experienced.

White and green liquor tanks can be satisfactorily lined with a hard burned common brick on the inside. This will greatly reduce the rate of corrosion on the tanks and at the same time has some insulation value. White liquor tanks especially, will start leaking in a few years if not protected.

Several factors affect refractory life in lime kilns. Starting and stopping kilns too frequently is hard on refractory life, as is a burner that impinges too much on the brick. Kiln drives should be provided with some dependable way of rotating the kilns in case of failure of the primary power source. If a kiln is not rotated until it cools down, the hot end will sag and when started up again is very apt to run eccentric.

Liquor Lines

For liquor lines throughout the pulp mill, quite an advance has been made in the last several years in both piping and valves. While the first cost of the alloy materials is higher, their use definitely reduces repair labor costs, inconvenience due to shutdowns, and has some effect on reducing chemical losses. Often a leaking pipe or valve cannot be changed the moment trouble develops. When it is changed, there are often losses from draining lines or cleaning up so the work can be done. The less frequently a replacement has to be made, the less the incidental losses will be.

Some of the better known materials used for liquor piping are stainless steel, Monel, cement lined steel pipe, cast iron with a low nickel content, and Ni-Resist.

Stainless is available in I.P.S. size, thin-walled seamless in the smaller sizes or rolled and welded in the larger sizes and cast pipe. I.P.S. size is the easiest to work as standard cast iron fittings can be used, but of course, the wall thickness is greater than necessary. It is understood that stainless fittings will be available soon for thin walled O.D. pipe and this should help to extend the use of this class of pipe. For the larger sizes particularly, a carbon steel flange can be made and welded to the O.D. pipe, leaving the end of the pipe flush with the face of the flange. The gasket will then keep almost all the liquor from the carbon flange, and standard cast iron fittings can be used or fittings can be fabricated from the stainless pipe. Where there is welding to be done, a type 347 stainless should be best. During the last few years all stainless steels have been difficult to secure, and usually when some was available, it was type 302 and 304. It was believed that type 302 had too much carbon, but trials were made with pipe and sleeves fabricated from type 304 sheet. After several years operation, no failures have been experienced and while type 304 is not recommended, it apparently is satisfactory for kraft mill liquors. Monel pipe and sleeves made from sheets has been satisfactory.

A standard weight black pipe lined with a special cement and sold under various trade names, such as Permaline and Duroline, have proven very satisfactory for white, green, and most black liquor services. This pipe has to be installed with care and can only be used with flanged fittings, but has the advantage of a lower first cost when compared with some other types, and the life is satisfactory. This pipe should be sawed with square ends, threaded, and a flange screwed on. The face of the flange must be flush with the end of the pipe, so the end of the steel pipe is protected by the gasket. A patching cement is available in case the lining at the ends cracks out. When there is not too much abrasive action, this pipe will last several years, even in places where steel pipe goes out in 12 to 24 months.

There are several good valves on the market for kraft liquor service. The principal requirements are a solid alloy disk, renewable alloy seat rings flush with the valve body ports, alloy iron body, outside screw and rising stem with T type disk connection. A valve of this type will last considerably longer than an all iron valve.

Job Planning

Beside the use of alloys for corrosive conditions, slight changes in troublesome spots can often reduce maintenance and lost time. If a shaft gives trouble, would it pay to make up a larger shaft and install it next time? Or could an outboard bearing be added? Should a sprocket be replaced with a hardened sprocket? Should a cast iron piece be changed to steel? Can a slight change in the method of operation reduce the likelihood of damage to a piece of equipment? Could a slight change in arrangement or location reduce the probability of damage or premature failure? These and other questions are intended for spots that fail prematurely. A good inspection and lubrication program will prolong the life of equipment that is subject to normal wear only.

A great deal of thought can be applied to what spare parts are needed, and if on hand, where they are located. If the parts on hand are assembled into a unit, down-time will be reduced. For instance, if parts are on hand for an important pump, the down-time will be much less if assembled into a complete rotating element ahead of time.

On a shutdown, much time can be saved and total maintenance costs reduced, if first a list of the work to be done is made up and gone over carefully to determine any jobs that can be done on the run without any loss of production on the paper machines. Next each job should be carefully planned so it can be done most efficiently. All material should be assembled and fabricated where possible. It may be possible to do a portion of the job while the mill is running. Just before shutdown, all material and auxiliary equipment to do the job should be moved to location. This includes welding machines, chain blocks, shoring, large tools, etc. When the actual shutdown takes place, the mechanic who already knows what jobs he will do moves in with his hand tools and the job is completed much sooner than if only half planned and preassembled.

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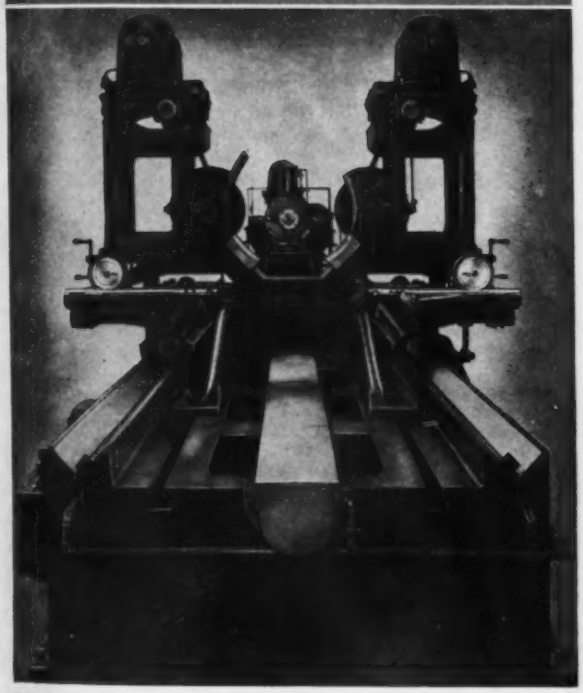

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Paper and Paper Stock Imports At New York and Other Ports

NEW YORK IMPORTS

WEEK ENDING OCTOBER 5, 1946

SUMMARY

Newsprint .....17,477 rolls, 45 bls.
Drawing Paper .....3 cs.
Miscellaneous Paper .....1 cs.

NEWSPRINT

News Syndicate Co., Inc., Colabee, Baie Comeau, 6888 rolls.
International Paper Co., International No. 1, Gatineau, 314 rolls.
N. Y. Sun, Sandland, Cornerbrook, 1330 rolls.
World Telegram, Sandland, Cornerbrook, 1360 rolls.
Clinton Paper Corp., Sandland, Cornerbrook, 602 rolls.
(———), Sandland, Cornerbrook, 45 bls.
H. G. Craig Co., G. T. D., Donnacona, 365 rolls.
N. Y. Journal American, Markland, Liverpool, N. S., 879 rolls.
N. Y. Tribune, Inc., Markland, Liverpool, N. S., 1750 rolls.
World Telegram, Markland, Liverpool, N. S., 561 rolls.
Brooklyn Eagle, Inc., Markland, Liverpool, N. S., 600 rolls.
Washington Post, Markland, Liverpool, N. S., 2456 rolls.
Alexandria Gazette, Markland, Liverpool, N. S., 25 rolls.
H. G. Craig Co., G. D. D., Donnacona, 347 rolls.

DRAWING PAPER

Bankers Trust Co., N. Y. City, Bristol, 3 cs.

MISCELLANEOUS PAPER

S. Hindberg, Bolivia, Copenhagen, 1 cs.

RAGS, BAGGINGS, ETC.

Comiter & Co., Scott E. Land, Shanghai, 350 bls. cotton waste.
Padawer Co., Scott E. Land, Shanghai, 418 bls. cotton waste.
Riverside Mills, Scott E. Land, Shanghai, 150 bls. cotton waste.
S. H. Waldstein Co., Scott E. Land, Shanghai, 200 bls. cotton picker waste.
McKay & Co., Scott E. Land, Shanghai, 100 bls. cotton waste.
E. C. Andres & Sons, Scott E. Land, Shanghai, 20 bls. cotton waste.
Empire Fibre Co., Scott E. Land, Shanghai, 200 bls. cotton waste.
Lush Cotton Products Co., Scott E. Land, Bombay, 600 bls. cotton waste.
Riverside Mills, Scott E. Land, Bombay, 599 bls. cotton waste.
Schimmel Trading Co., Scott E. Land, Bombay, 132 bls. cotton waste.
New England Waste Co., Scott E. Land, Bombay, 1115 bls. cotton waste.
Volkart Bros., Scott E. Land, Bombay, 400 bls. cotton waste.
Continental Bank Trust Co., Egidia, Glasgow, 272 bls. old webbing.
Ayres W. C. Jones, City of Kimberley, Cochin, 444 bls. cotton waste.
McKay & Co., City of Kimberley, Cochin, 200 bls. cotton waste.
Padawer & Co., Exchester, Calcutta, 40 bls. cotton waste.
New England Waste Co., Crawford W. Long, Santos, 100 bls. cotton waste pickers.
The Seldner Corp., Crawford W. Long, Santos, 137 bls. cotton waste residue.
New England Waste Co., Mormactern Natal, 89 bls. cotton waste.
Irving Trust Co., Mormactern, Cabedello, 350 bls. cotton waste.
Riverside Mills, Mormactern, Fortaleza, 268 bls. cotton waste.
Continental Bank Trust Co., New York City, Bristol, 237 bls. old army overalls.
New England Waste Co., Trein Maersk, Shanghai, 100 bls. cotton waste.
Riverside Mills, Trein Maersk, Shanghai, 292 bls. cotton waste.
Padawer & Co., Trien Maersk, Shanhai, 411 bls. cotton waste.

CASEIN

F. H. Paul & Stein Bros., Bessemer Victory, Buenos Aires, 300 bags unground rennet casein.
E. M. Sergeant Pulp & Chemical Co., Bessemer Victory, Buenos Aires, 500 bags ground lactic casein.
Vitamerican Oil Corp., Bessemer Victory, Buenos Aires, 40 bags casein.
E. Lang, Bessemer Victory, Buenos Aires, 834 bags casein.
Bankers Trust Co., Bessemer Victory, Buenos Aires, 741 bags casein.

GLUESTOCK

H. Remis, Crawford W. Long, Santos, 6 b7ls., 76 rolls.

PHILADELPHIA IMPORTS

WEEK ENDING OCTOBER 5, 1946

Tradesman's National Bank Trust Co., New York City, Newport, 1969 bls. old webbing.

BOSTON IMPORTS

WEEK ENDING OCTOBER 5, 1946

E. C. Andres, Trein Maersk, Shanghai, 300 bls. cotton waste.
Leigh Textile Co., Trien Maersk, Shanghai, 100 bls. cotton waste.

OPA Raises Differentials On Newsprint Sheets

WASHINGTON—Greater differentials were established this week for sheeting and packing newsprint in a move designed to encourage manufacturers to produce sheeted newsprint for customers desiring it in that form. The differentials, effective October 7, which can be added to the prevailing ceilings for newsprint in rolls, are listed in dollar and cents terms, and are generally $5 a ton above the October 1-15, 1941 differentials.

For standard sheets of newsprint and the customary pack, the new differential that will be most commonly used is $13 a ton. The range is up to $28 a ton, depending on the type of packing. For cutting into smaller sized than standard sheets, further differentials are provided ranging from $10 to $20 a ton.

The following prices include the dollar per ton increase, and the new base prices for the major items. Prices at port cities $1 less.

Sheeting and Packing

	Increase per ton	New Base Price
Standard (20"x30" or larger)	$9.00	$84.00
Soft lap bundles	4.00	79.00
Flat in bundles (without chipboard top and bottom)	5.00	80.00
Flat in bundles (with chipboard top and bottom)	6.00	81.00
Packing in carton or frames	8.00	83.00
Packing in cases	15.00	90.00
Packing on skids	6.00	81.00
Trimming (1 or 2 sides)	4.00	79.00
Trimming (3 or 4 sides)	6.00	81.00

Cutting to Small Sizes

The following differentials include wrapping, banding or divider marking in 500 sheet reams and may be applied in addition to the differentials mentioned above.

	Per cwt.
84 to 336 sq. in.	$0.50
42 to 84 sq. in.	.75
Less than 42 sq. in.	1.00

British Columbia Solicited To Stop Forest Fires

VANCOUVER, B. C.—Determined efforts have been made during the past summer by the Britsh Columbia branch of the Canadian Forestry Association to arouse public interest in forest fire prevention. The association has sent circular letters to all the Boards of Trade, Chambers of Commerce and service groups in British Columbia. In addition, the support of a very large number of wholesale and retail merchants thorughout the province have been enlisted and they were requested to co-operate by donating a portion of their advertising space to the presenting of some public warning as to the importance of prevention of forest fires.

George X. Miller, secretary-manager of the branch, reports that the co-operation received as a result of this effort produced a very large volume of advertising and other publicity designed to aid in overcoming the creation of unnecessary fire hazards.

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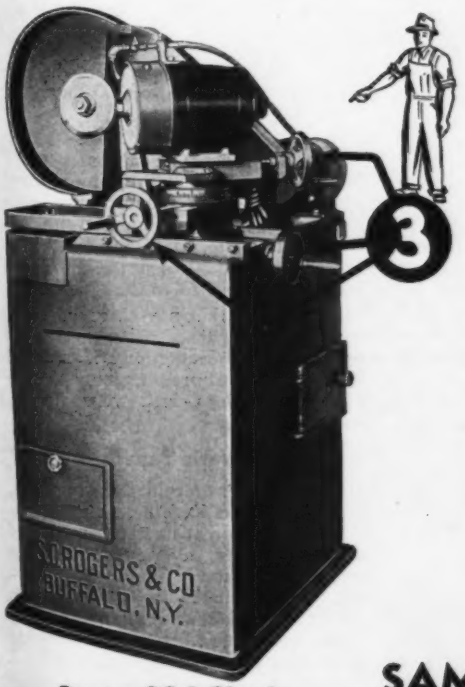

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PRECISION QUALITY **ROGERS KNIFE GRINDERS** SINCE 1887

Week's Record of Trends in The Pulp and Paper Market

Office of the PAPER TRADE JOURNAL,
Wednesday, October 9, 1946.

Production of domestic paper and paperboard continues at high levels with the figure for August estimated at 1,715,710 tons, with daily average production running about 17 per cent ahead of last year. Supplies, however, are not expected to improve until next spring. Many major newspapers could use at least 25 per cent more newsprint than is available, while most converters and distributors could use up to 50 per cent more supplies. Inventories of most grades of paper are negligible; while consumers have little opportunity for building up stocks of European pulp. Demand for practically all grades of paper and board remains heavy with reports from various sections of the country emphasizing the inability of many consumers to obtain adequate supplies for current consumption; although some of this trouble may arise from difficulties in distribution. Reports indicate that manufacturers of basic lines of stationery and supplies will need at least a year to catch up with demand for their products. Retail outlook for gift supplies for the holiday season is more optimistic. Supplies of gift wrapping, seals and other items of special holiday appeal, including social stationery, will be available in much larger quantities. Last year stocks were only about 25 per cent of estimated demand. This year it is expected that stocks will be 50 to 60 per cent of demand. Another optimistic view is reported concerning toilet tissues. Current shortages were brought about when all major tissue paper mills shut down in July in order that a thorough overhauling of machinery could be accomplished. In the meantime, prices asked by tissue mill operators did not coincide with price ceilings set by OPA, with the result that tissue shipments were held up once again. OPA relented and a 6 per cent price boost has started shipments rolling once more, and now housewives may expect to find their local suppliers well stocked within a month or two.

Manufacturers of groundwood printing, book and fine papers continue to be plagued by shortages of woodpulp, rags, and casein. A large number of the book and fine paper mills are non-integrated plants and depend upon market pulp for their operation. Outlook for full operation by these mills during the rest of the year is dubious in view of the limited woodpulp supplies expected from Sweden. While no material change is expected in the receipts of Swedish pulp, it is anticipated that imports from Finland will average around 20,000 tons a month during the remainder of the year; with small quantities likely to be received from Norway during this period. However, assuming that the demand for paper and paperboard continues at current levels, the over-all volume anticipated will fall short of meeting full requirements of mills consuming purchased pulp. Pulpwood procurement on the West Coast and in the southern region continues to be handicapped by failure of logging equipment and trucks which are growing older and older. Shortages of railroad cars, particularly in the South, have slowed down deliveries to mills and in a few areas wet weather has hampered logging operations.

Demand for board of all types still exceeds production by a wide margin, supply of set-up boxboard being particularly tight. While there is no way to measure the extent of total demand because board manufacturers refuse to accept all orders offered so as not to be committed too far in advance, and since there is some duplicating of orders by consumers, unfilled orders reported by the National Paperboard Association as of the end of August show 176,361 tons for containerboard and 387,938 tons for boxboards, a total of 564,299 tons. This compares with orders for 147,540 tons of container and 347,159 tons of boxboard, a total of 494,699 at the end of August 1945. On the basis of the association's figures, unfilled orders at the end of August 1946 were 14.1 per cent over September 1, 1945; while production during the first 7 months of this year had increased 3.5 per cent over the comparable period of last year.

The index of general business activity for the week ended September 28 rose to 133.8 from 132.9 in the previous week, compared with 119.5 for the corresponding week in 1945. The index of paperboard production rose to 155.3 from 154.6 in the previous week, compared with 141.2 for the corresponding week in 1945.

Paper production for the week ended September 28 was estimated at 106.6 per cent, compared with 105.8 for the preceding week, with 98.1 for the corresponding week in 1945, with 93.5 for 1944, with 91.7 for 1943, and with 87.8 per cent for the corresponding week in 1942.

Paperboard production for the week ended September 28 was 101.0 per cent of capacity, compared with 100.0 per cent for the preceding week, with 96.0 for the corresponding week in 1945, with 95.0 for 1944, with 97.0 for 1943, and with 80.0 per cent for the corresponding week in 1942.

Wood Pulp

Over-all domestic production of wood pulp during the first 7 months of 1946 was virtually at the same level as in the similar period of 1945; although an appreciable decline took place in unbleached sulphite, while bleached sulphite, soda pulp and groundwood ran ahead of the general trend and registered moderate gains over the previous year. Over-all inventory position at the end of July was slightly above June, with a decline of 15 per cent in unbleached sulphate being offset by gains of 13 per cent and 8 per cent respectively, in bleached and unbleached sulphite.

During the first 7 months of 1946 imports of Canadian pulp were approximately 66 per cent of all foreign pulp received here. This cannot be accepted as establishing a permanent relationship between Canada and other pulp producing countries as suppliers to the United States, inasmuch as the European countries which, before the war, furnished 64 per cent of all pulp brought into the United States, have not yet succeeded in restoring their production capacities to normal levels.

Rags

Demand for rags, particularly new cotton cuttings, continues to exceed supply. Old cotton rags are being sought after by paper manufacturers as substitutes for new white cuttings. Italian roofing rags are reported at $65 per ton. Heavy wipers continue at $50 to $55 in combination deals with classification stock at $31 and $29.

June imports of rags amounted to 2,410 tons, continuing the rising trend of previous months. Imports for the first 6 months of 1946 were approximately 8,300 tons. June exports were about 800 tons. Exports for the first 6 months of 1946 were 3,393 tons.

Old Rope and Bagging

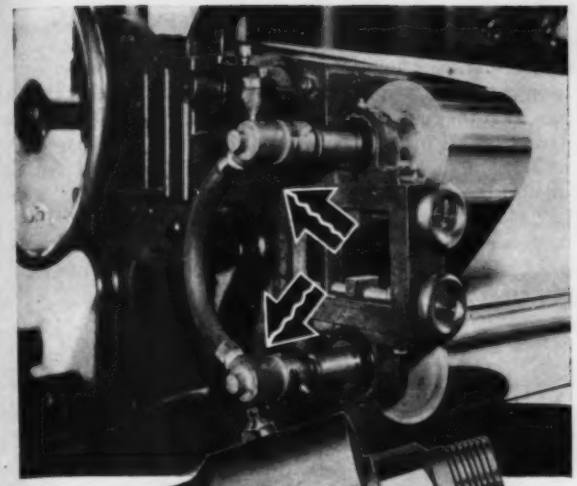
Market for old rope continues steady. Manila is reported slightly improved in supply. Quotations are unchanged with Manila at 5.75c per pound and sisal, the No. 1 substitute, at 4.75c. Soft jutes are strong at 4.50 to 5c; while mixed strings remain 1.75 to 2c.

Bagging market has eased up somewhat with No. 1 scrap burlap at $4.50 to $4.75. Mill run gunny is reported $4.12 to $4.25. Foreign gunny sales at $4.35 to $4.50 ex-dock were also reported.

Waste Paper

Waste paper receipts during 8 of the last 9 weeks have been running below consumption at Eastern paperboard mills, reducing average inventories from 16 to 14 days. The weekly shortage was estimated at approximately 2,000 tons, with consumption at Eastern mills averaging between 7,000 and 8,000 tons daily.

All high grades remain steady, with white shavings moving easily at the $67.50 ceiling. Kraft, especially triple sorted, and book stock is in good demand. Mills, however, are still insistent on getting the right kind of paper; especially with regard to book paper.



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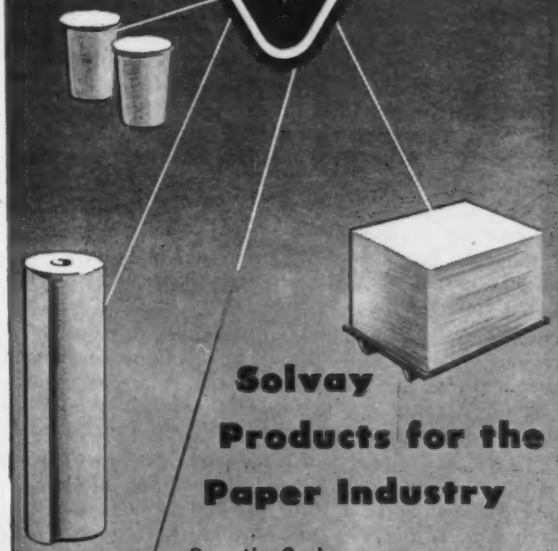

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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, October 9, 1946.

BLANC FIXE—Demand continues active as raw materials remain tight. Pulp is currently quoted at $40 per ton, in barrels, car lots, at works; the powder is currently quoted at $60 per ton, car lots, f.o.b. works.

BLEACHING POWDER—Supplies are reported adequate to meet demand, with shipments temporarily delayed due to drum shortage. Quotations are unchanged. Prices on bleaching powder range from $2.50 to $3.10 per 100 pounds, in drums, car lots, at works.

CASEIN—Current prices on processed acid-precipitated casein are reported at 48 to 49 cents per pound for domestic grades, and 45 cents per pound for Argentine grades; f.o.b. shipping point, with quantity not specified at the present time.

CAUSTIC SODA—Supplies tightest ever as market remains critcal. Sheet steel shortage creates drum and container scarcity. Cutback production further reduces stock. Solid caustic soda is quoted at $2.30 per 100 pounds; flaked and ground is quoted at $2.70 to $2.95 per 100 pounds. All prices car lots.

CHINA CLAY—Supplies are becoming tighter as demand continues to increase. Quotations remain unchanged. Domestic filler clay is currently quoted at from $8.50 to $9 per ton; coating clay is quoted at from $12 to $22 per ton, at mine. Imported clay is quoted at from $22 to $25 per long ton, ship side. All prices quoted in car lots.

CHLORINE — Market tight, with current demand above production capacity. Tank cars and steel container situation slow shipments. Quotations unchanged. Chlorine is currently quoted at $2.00 to $2.25 per 100 pounds, in single unit tank cars, f.o.b. works.

ROSIN—Gum rosin in drums, per 100 pounds net, in yard, New York. B, $8.30; D, $8.30; E, $8.83; F, G, H, I, K, M, N, WG, and WW, $9.30. All prices in car lots, rosin in bags, 5c less.

SALT CAKE—Demand increasing with supplies showing some improvement. Prices remain unchanged. Domestic salt cake is quoted at $15 per ton, in bulk. Chrome salt cake is quoted at $16 per ton. All prices in car lots, f.o.b. shipping point.

SODA ASH—Supplies continue short, demand active, previous orders filled. Quotations continue unchanged. Current prices, car lots, per 100 pounds, are as follows: in bulk, $.95; in paper bags, $1.05; and in barrels, $1.35. Current boxcar shortage temporarily delays shipments.

STARCH—Active demand reported, with offerings limited, market firm. Starch prices continue steady. The pearl grade is quoted at $5.67 per 100 pounds; powdered starch at $5.82 per 100 pounds; both prices in bags, car lots, f.o.b. Chicago.

SULPHATE OF ALUMINA—Demand active, supply fair. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.20 per 100 pounds, in bags, car lots, f.o.b. works. The iron free is currently quoted at $1.75 to $2.00 per 100 pounds, in bags, at works.

SULPHUR—Strong seasonal demand is reported with stocks plentiful. Annual contracts are quoted at $16 per long ton, f.o.b. mines; the price f.o.b. at Gulf Ports is $17.50 per long ton. Prices in car lots. Some shipments temporarily delayed.

TALC—Domestic and French grades are moving in fair volume with prices steady. Domestic grades are currently quoted at from $16 to $30 per ton at mines; Canadian at $24 to $30 per ton. All prices on car lots.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March, 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

Standard News, per ton—

Roll, contract	$74.00	@	—
Sheets	83.00	@	—

Kraft—per cwt.—Carload Quantities Zone A, Delivered

Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard bag	*4.75	"	—

* Prices for Standard Wrapping are for 40 lb. base weight; for Standard Bag for 30 lb base weight.

Tissues—Per Ream—Carlots

White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—

Toilet—1 M. Sheets—Per Case

Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—

Paper Towels, Per Case—

Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—

Manila—per cwt.—C. l. f. a.

No. 1 Jute	11.25	@	—
No. 1 Manila 35 lb.	6.00	"	7.00

Boards, per ton—

News	*58.00	@	—
Chip	*58.00	@	—
Sgl. Mla. L1. Chip	*67.00	@	—
White Uat. Coated	*81.00	@	—
Kraft Liners 50 lb.	*74.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—White, Assorted Items

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.75@$46.75	$40.90@$48.00
100% Rag.	32.85 " 38.50	34.00 " 40.00
85% Rag	.... "	30.55 " 38.75
75% Rag	24.30 " 28.50	24.45 " 30.00
65% Rag	.... "	.... " ....
50% Rag	20.05 " 24.50	21.25 " 25.75
25% Rag	17.85 " 21.75	19.00 " 23.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items

	Bonds	Ledgers
No. 1	$12.00@$14.50	$13.15@$16.00
No. 2	11.25 " 13.75	12.25 " 15.00
No. 3	.... "	.... " ....
No. 4	10.60 " 13.00	11.75 " 14.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper

No. 1 Glossy Coated	$14.70@$16.75	
No. 2 Glossy Coated	13.75 "	15.50
No. 3 Glossy Coated	13.20 "	16.00
No. 4 Glossy Coated	12.80 "	14.30
No. 1 Antique (Watermarked)	11.35 "	12.75
No. 2 Offset	10.65 "	12.25
A Grade E. F.	10.60 "	12.00
A Grade S. & S. C.	11.00 "	12.50
B Grade E. F.	10.30 "	11.75
B Grade S. C.	10.70 "	12.25
C Grade E. F.	10.00 "	11.50
C Grade S. C.	10.40 "	12.00
D Grade E. F.	9.70 "	11.00
D Grade S. & S. C.	10.10 "	11.50

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers' Prices, Less Freight Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$103.50
Unbl. Softwood Sulphite	90.00
Bl. Hardwood Sulphite	100.50
Unbl. Hardwood Sulphite	87.50
N. Bleached Sulphate	103.50
S. Bleached Sulphate	97.00
N. Semi-Bleached Sulphate	98.00
S. Semi-Bleached Sulphate	91.50
N. Unbl. Sulphate	83.50
S. Unbl. Sulphate	76.50
Bleached Soda	93.50
Unbleached Soda	88.00
Groundwood	64.00
Ground—Machine Dried	67.00
Sulphite Screenings	50.00
Sulphate Screenings	44.00
Groundwood Screenings	37.50
N. Unbl. Sulphate Siderums	83.50
S. Unbl. Sulphate Siderums	76.50
Standard Newsprint Siderums	64.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$12.50
Lake Central	12.50
Southern	15.00
West Coast (in area)	9.50
West Coast (out area)	15.50

	50%-80% Air Dry Weight
Northeast	$10.50
Lake Central	10.50
Southern	13.00
West Coast (in area)	8.50
West Coast (out area)	14.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$7.50
Lake Central	7.50
Southern	10.00
West Coast (in area)	6.50
West Coast (out area)	12.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags

(Nominal Prices Delivered to Mill + 5% Brokerage)

Shirt Cuttings—		
New White, No. 1	7.25 @	Nominal
Silesias No. 1	5.75 "	"
New Unbleached	7.50 "	"
Blue Overall	5.50 "	"
Fancy	3.50 "	"
Washables	3.00 "	"
Bleached Khaki Cutting	4.25 "	"
Unbleached Khaki Cuttings	3.50 "	"

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FELTS

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Old Rags

White, No. 1—			
Repacked	3.80	●	Nominal
Miscellaneous	3.20	"	"
White, No. 2—			
Repacked	2.90	"	"
Miscellaneous	2.65	"	"
Thirds and Blues—			
Repacked	2.20	"	"
Miscellaneous	1.30	"	"
Roofing Rags—			
No. 1	1.55	"	"
No. 2	1.45	"	"
No. 3 (bagging)	1.35	"	"
No. 4	1.35	"	"
No. 5A	1.35	"	"
Old Manila Rope	5.75	"	"

Foreign Rags

(All Prices Nominal)

New Rags

New Dark Cuttings	6.00	● Nominal
New Mixed Cuttings	6.50	" "
New Light Silesias	5.75	" "
Light Flannelettes	5.75	" "
New White Cuttings	12.00-14.00	
New Light Oxfords		Nominal
New Light Prints	8.00-10.00	

Old Rags

No. 1 White Linens	8.50	●	Nominal
No. 2 White Linens	7.50	"	"
No. 3 White Linens			Nominal
No. 4 White Linens	3.25	●	Nominal
No. 1 White Cotton	4.75	"	"
No. 2 White Cotton	3.75	"	"
No. 3 White Cotton	3.00	"	"
No. 4 White Cotton	2.20	"	"
Extra Light Prints	2.40	"	"
Ord. Light Prints	5.50	"	"
Med. Light Prints	4.75	"	"
Dutch Blue Cottons			Nominal
French Blue Linens			Nominal
Checks and Blues	4.00	"	"
Linsey Garments	4.00	"	"
Dark Cottons	3.60	"	"
Old Shopperies	3.35	"	"
New Shopperies	3.50	"	"
French Blues			Nominal

BAGGING

(Prices to Mill, f.o.b. N. Y.)

Gunny No. 1—			
Foreign	4.00	●	Nominal
Domestic	3.30	"	"
Wool Tares, light	4.00-4.75		
Wool Tares, heavy	4.50	●	Nominal
Bright Bagging	3.50	"	"
Manila Rope—			
Foreign			Nominal
Domestic	5.75	●	Nominal
Jute Strings	4.50	"	"
No. 1 Sisal Strings	3.00	"	"
Mixed Strings	1.50	"	"

Waste Paper

Nominal Prices to Mills

(Dollars Per Ton)

F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$67.50	●	—
No. 1 Hard White Envelope Cuts	62.50	"	—
No. 1 Hard White Shavings, unruled	57.50	"	—
No. 1 Hard White Shavings, ruled	50.00	"	—
Soft White Shavings, one cut	57.50	"	—
No. 1 Soft White Shavings	50.00	"	—
Soft White Shavings, Misc.	43.00	"	—
No. 1 Fly Leaf Shavings	33.50	"	—
No. 2 Fly Leaf Shavings	22.50	"	—
No. 1 Groundwood Fly Leaf Shavings	25.00	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	18.50	"	—
Mixed Colored Shavings	15.50	"	—
Mixed Groundwood Colored Shavings	18.00	"	—
Overissue Magazines	33.50	"	—
No. 1 Heavy Books & Magazines	38.50	"	—
Mixed Books	22.00	"	—
No. 1 White Ledger	46.00	"	—
No. 2 Mixed Ledger, colored	40.00	"	—
New Manila Envelope Cuttings, one cut	57.50	"	—
New Manila Envelope Cuttings	53.00	"	—
Extra Manilas	39.00	"	—
Mixed Kraft, Env. & Bag Cuttings	55.00	"	—
Kraft Envelope Cuttings	65.00	"	—
Triple Sorted, No. 1 Brown Soft Kraft	50.00	"	—
New 100% Kraft Corrugated Cuttings	45.00	"	—
No. 1 Assorted Old Kraft	35.00	"	—
New Jute Corrugated Cuttings	18.50	"	—
Old 100% Kraft Corrugated Containers	35.00	"	—
Box Board Cuttings	14.50	"	—
White Blank News	33.00	"	—
Overissue News	22.00	"	—
No. 1 News	20.00	"	—
No. 1 Mixed Paper	19.00	"	—
Old Corrugated	28.00	"	—
Mill Wrappers	22.00	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.26	●	—
White Hemp	.26	"	—
Fine Polished—			
Fine India	.31	"	—
Unpolished—			
Box	.20¼	"	—
Paper Makers	.26	"	—
Tube Rope	.22	"	—
Wall Paper	.23½	"	—
Wrapping	.26	"	—
Soft Fiber Rope	.22	"	—
Cotton	.28	"	—
(Hard Fiber)			
Medium Java	.23	"	—
Mex. Sisal	.21	"	—
Manila	.33	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill)

Shirt Cuttings—			
New White No. 1	.07¼		
New White No. 2	.05¾		
Light Silesias	.05¾		
Black Silesias, soft	.03¾		
New Unbleached	.07½		
Washable Prints	.04¼		
Washable No. 1	.03		
Blue Overall	.05½		
Cottons—According to grades—			
Washable Shredding	.01¾		
Fancy Percales	.04¾		
New Black Soft	.03¼		
Khaki Cuttings—			
Unbleachable Cotton Cuttings	.03½		
Bleachable Cotton Cuttings	.04¼		
Men's Corduroy	.03½		
Ladies' Corduroy	.03		
Cottonades	.03¾		

Domestic Rags (Old)

White No. 1—Repacked	3.80	●	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
White No. 2—Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	●	3.50
No. 1 Clean Bright—Sisal Strings	.04	"	—
No. 2 Clean Bright—Sisal Strings	.03	"	—
Sisal Jute	.02½	"	.02¾
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	●	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.13	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Ledger, colored	2.00	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.40	"	—
Overissue News	1.00	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

No. 1 Hard White Shavings, unruled	2.87½	●	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.75	●	2.90
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	* —	"	4.00
Mixed Rope	1.60	"	—
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.00	"	3.25
South America	—	"	3.25
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	
Aust. Wool Pouches	—	"	3.85
New Zealand Wool Pouches	—	"	3.35
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Roofing Bagging	1.35	"	

* OPA Maximum Prices.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	●	.04½
Fancy Percales	.04¾	"	.05
New White No. 1	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06½
Underwear Cutters, Bleached	.06¾	"	.06½
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06½
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06½
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03½
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06½
B. V. D. Cuttings	.06¼	"	.06¼

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	●	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.30
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	●	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.30	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—

Gotham Gravure Inks

Mix with bronze and aluminum powders for rotogravure printing

*Zyroto Vehicle #10919

Non-jelling
Non-tarnishing
Quick drying
Right for cellophane or paper
Use economical toluol or xylol for thinning

Sample on request

*Reg. U. S. Pat. Off.

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Long Island City 1, New York

PRICE & PIERCE, Ltd.

WOOD PULP & PAPER AGENTS

for domestic and export

60 EAST 42nd STREET
New York 17, N.Y.

WE ARE AMERICA'S STOCK CUTTING SPECIALISTS

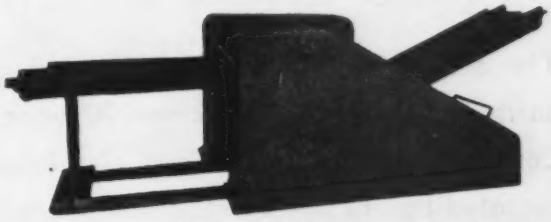
Taylor-Stiles & Company have made cutters for many industries and supply the stock cutting needs of a majority of the leading paper mills of America because:

1) Taylor-Stiles has furnished specialized cutting machines for fine and coarse paper making since 1880.

2) Taylor-Stiles has kept pace with every improvement in metals, knife making, power development and paper making processes.

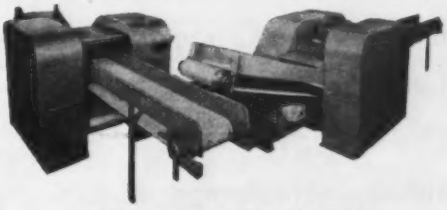
3) Taylor-Stiles has increased the quality and speed of stock reduction many times over, in the last 58 years.

Below are two types of modern Taylor-Stiles cutters.



NO. 1 RAG CUTTER

Capacity 2000 pounds an hour, cuts all kinds of paper stock, rags, bagging, burlap, board and paper. A general purpose machine.



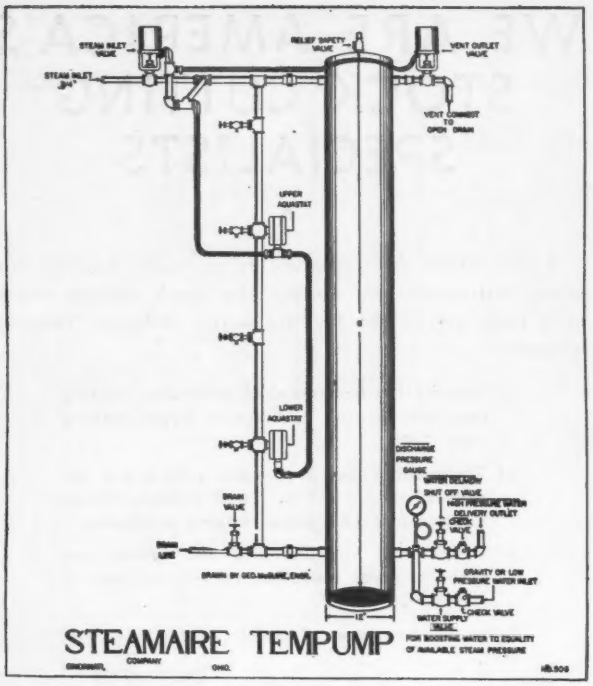
NO. 36 TANDEM CUTTER

Fairly large capacity. For double or cross-cutting of rags into approximately square pieces of predetermined dimensions.

Let us know your stock cutting needs.

TAYLOR-STILES and Company
CUTTING MACHINES & KNIVES

10 Bridge Street, Riegelsville, N. J.



The only water pump with NO moving parts, NO motor, NO packing, NO wear. Complete automatic feed and discharge operated by 110 volt electric controls.

Wherever high pressure water is required, and equally high pressure steam is available, the TEMPUMP will deliver any quantity of water at the required pressure — constantly. Will handle any liquid hot or cold.

For filling roof storage tanks; cooling towers; boiler water feed systems; sprinkler systems, etc.

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CINCINNATI, OHIO

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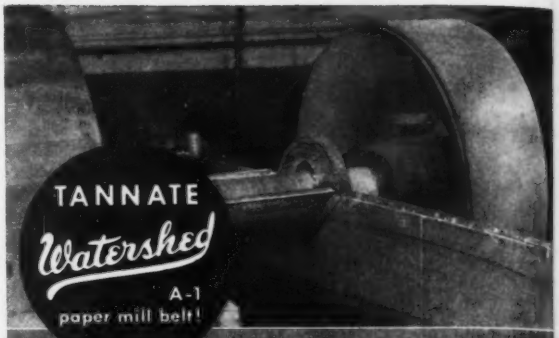


CARRIES FULL LOAD even when damp

Production flows smoothly and without interruption when your paper machines are equipped with Tannate Leather Belting. Tannate gives years of dependable service. Its unusual strength and firm pulley grip keep machines running smoothly at full capacity even under varying load conditions. Tannate is treated to resist moisture, pulls full load even when damp. Moist heat up to 170° F. has little effect on Tannate, and it is resistant to oil and many chemicals.

When properly installed, Tannate requires little maintenance and will stay on the job giving long, trouble-free service and maximum production.

—Established 1702—

J. E. RHOADS & SONS

35 North 6th Street — Philadelphia 6, Penna.

NEW YORK • CHICAGO • ATLANTA

RHOADS Tannate

WATERSHED LEATHER BELTING

The Great Northern-Waterous Grinder For 4 Ft. Wood
The Great Northern Grinder For 4 Ft. Wood
The Great Northern Grinder For 30" Wood
The Great Northern Grinder For 24" Wood

Rotary Pulp Screens
Flat Screens
Deckers
Cylinder Molds
Hydraulic Grinder Lathes
Automatic Reversible Showers

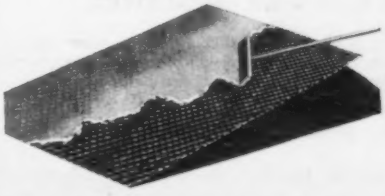
Roll Heading Presses
Calender Doctors
Doctor Blades
Stone Dressing Burrs
White Water Samplers
Etc. Etc. Etc.

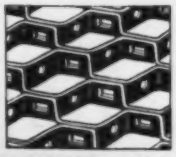
MONTAGUE MACHINE COMPANY
Turners Falls, Mass.

FLOORS—GRATINGS—STAIR TREADS...*THE bases of this $150,000,000 paper mill plants and equipment*

Paper mills of the U.S. are planning over $150,000,000 immediate expenditure for new plants and equipment. Now is the time to make sure these are solidly based on long-enduring level floors, and that gratings and treads assure greatest firmness and safety.

Klemp HEXTEEL
Heavy Duty Surface Armor





HEXTEEL
Easily, quickly applied in concrete or mastic and filled flush. Heavy steel mesh makes rigid, one-piece protection. Exposed bearing surface takes brunt of traffic.

FLOORSTEEL
Flexible mesh also imbedded in concrete or mastic, and filled flush. Provides close network of steel rails. Prevents ruts, potholes, etc.

Klemp FLOORSTEEL
The floor armor that rolls out like a rug

Klemp OPEN STEEL
GRATINGS and STAIR treads

Send for complete Klemp Catalog
Shows Klemp Steel flooring, gratings, treads, etc., that have long demonstrated superiority in severe requirements of pulp and paper mills. Easily laid. Full data. Also—repair old floors with KLEMP Hexteel or Floorsteel. • • • WIRE OR WRITE TODAY!

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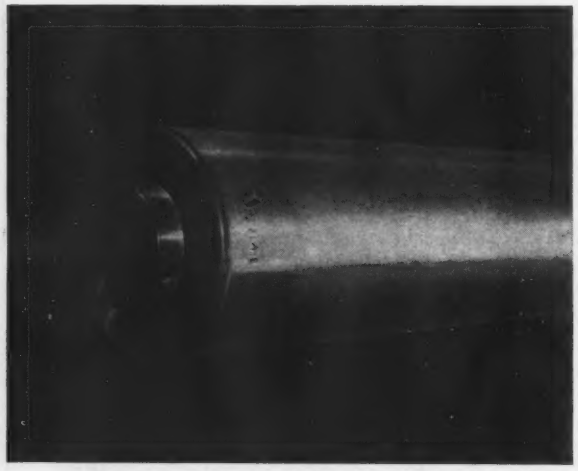
*Reg. Trade Mark

The Brushes That Set New Standards for Efficiency in Paper Making



***Jenkins Metal Core* brushes include brushes for spraying on colors, for wetting tissues, and for other uses.**

JENKINS METLOKOR* CYLINDER *BRUSHES*

The Metal Cores of these brushes are made from cold drawn steel or aluminum. These cores will not sag, warp, crack or split. They assure perfect alignment and balance.

Bristle (either nylon or natural bristle) is wound on the cores with flat copper wire, set in a special moisture-proof cement.

New Bristle can be put on cores when the original bristle becomes worn.

Flat Brushes—We also manufacture china bristle flat brushes, gray bristle scrubbers and Badger Hair Finishing Brushes—for coated stock.

*Reg. U. S. Pat. Off.

M. W. JENKINS' SONS, INC.
CEDAR GROVE, ESSEX COUNTY, NEW JERSEY

Manufacturers of industrial brushes exclusively since 1877.
Cedar Grove, Essex County, New Jersey

Butterworth Rolls are Locked on the Shaft

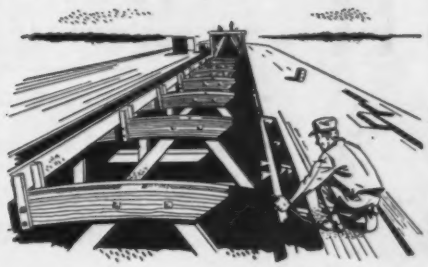
Butterworth Calender Rolls are locked on the shaft under terrific pressure. They cannot slip. They will not work loose. Heads and shafts are of forged steel. Taper wedges are used.

Butterworth Calender Rolls are of ideal hardness, smoothness and density to produce perfect finishes. They give many extra hours of service without requiring turning down or refilling. Remember, the finish on the paper can only be as good as the rolls in the calender. We furnish new rolls or will refill your present rolls.

For full information, write or call H. W. Butterworth & Sons Company, Philadelphia 25, Pa. — Textile Finishing Machinery Company Division, Providence, R. I. : : Charlotte, N. C., 1211 Johnston Bldg. : : In Canada — W. J. Westaway Co., Hamilton, Ont.

Butterworth CALENDER ROLLS

Up where trouble threatens..



Build in Protection with

WOLMANIZED LUMBER*

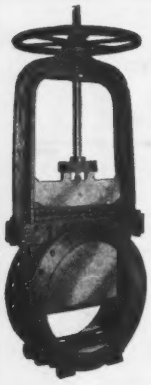
On roof structures, where moisture condenses, soaks into every niche and cranny . . . starts rot spots . . . Wolmanized Lumber is needed, badly! Why? Because in this lumber, impregnated with Wolman Salts* preservative by pressure treatment, rot will not set in. Your roof trusses and decks . . . Wolmanized . . . will give you many more years of service where rot-producing moisture is present.

LUMBER with a PLUS!

Wolmanized Lumber gives you all of wood's advantages . . . speed of erection, light weight, resilience, high insulating value, paintability, low first cost . . . long life.

*Registered trademarks

1680 McCORMICK BUILDING, CHICAGO 4, ILLINOIS



RECORD PAPER & PULP STOCK VALVES "BONNETLESS SELF CLEARING" – – – "RESIDUE POCKETLESS TYPE"

METALS — I.B.B.M. oil iron, bronze or stainless steels, body parts plain or rubber lined.

The photo of 24" Fig. 241 I. B. B. M. valve while illustrating the gate bottom wedge system for forced gate seating and "GUILLOTINE" edge for shearing fibre at seat also shows the packing box and yoke as separate units. Both adjustable.

• The "FAST THREADED" screw stem and ball bearing speeds valve operation.

• The packing box is extra deep, is adjustable and provided with specialized lubricated packings and special type gland and compression bolts.

• The yoke mountings are such that yokes for various methods of gate operation are interchangeable.

• Replaceable gate edge shoes are used in valves 10" and larger. These shoes are of special value when valves are installed stem and pipe horizontal.

"RECORD PRODUCTS EXTENSIVELY USED IN DEFENSE PROJECTS."

RECORD FOUNDRY & MACHINE COMPANY

LIVERMORE FALLS, MAINE, U. S. A.

COLORS

for

Board and *Paper*

Green

CHROMIUM OXIDES

Black Brown Red Yellow

IRON OXIDES

LAMP BLACK

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UMBERS

VENETIAN REDS

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KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT LINER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

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TENAX

"TENAX FELTS ARE TOUGH"

WHEN ORDERING FELTS

. . . Specify TENAX. There's a TENAX FELT to meet every specification, in making paper, board and allied products. Let TENAX bring you peak operating efficiency and greater economy!

LOCKPORT FELT COMPANY

NEWFANE, N. Y.

Serving the paper industry since 1891

Four of the many plate patterns cast for use with Bauer pulpers.

EVERY BAUER INSTALLATION "SPECIAL" TO REQUIREMENT...

Bauer pulpers are "tailor made" for the work to be done. For instance, mills pulping mixed papers for boxboard or container, or mills salvaging rejects and screenings, are supplied entirely different plate patterns.

Therefore, regardless of the grades you run, *thru plate selection*, Bauer pulpers can, in almost every case, be equipped to do your particular job.

As you look about for ways to improve your preparation equipment, be sure to consider installing Bauer pulpers.

36" [illegible] Plate patterns as required.

THE BAUER BROS. CO.
SPRINGFIELD, OHIO

Bauer
THE BAUER BROS. CO.
SPRINGFIELD, OHIO

LET LITHCOTE (COATING & LINING)

★BEAT CORROSION
★CUT DE-SLIMING COSTS
in YOUR plant

Lithcote is the new, long-lasting, acid-resistant coating that's putting an end to many paper mill corrosion problems. Plant records show substantial economies on Lithcote-treated pipe-lines and equipment. In de-sliming savings alone, Lithcote puts these plants way ahead in terms of time and dollars.

Smooth, baked-on, glass-like Lithcote (a phenol formaldehyde synthetic resin) is a lasting defense against slime accumulation in white-water and stock lines. Applied to Fourdrinier parts, Lithcote effectively eliminates corrosion around the wet-end of the machine. Existing lines, parts, and tanks reclaimed and conserved with Lithcote, last indefinitely.

Lithcote protection can reduce shutdowns throughout your mill in:
WHITE WATER LINES • STOCK LINES • PIPE FITTINGS • SCREEN BODIES • SCREEN COVER PLATES • DECKER BODIES • SPIDER SEGMENTS • FILTER BODIES • C. I. END PLATES • SAVEALL BODIES • STOCK CHESTS • AGITATORS • PROPELLERS • SHAFTS • STUFFING BOXES • WALL FRAMES • PUMPS • IMPELLERS.

Write to Bedford Development Corporation for factual details and case histories. Lithcote may be applied in our plant or we will send a trained crew to your plant for coating or lining equipment too large for shipping to us.

BEDFORD DEVELOPMENT CORP.
230 PARK AVENUE • NEW YORK 17, N. Y.
Sales Representatives for
LITHGOW CORPORATION • CHICAGO

UNITED BLACKS

DIXIE

KOSMOS

PARIS BLACKS

Carbon blacks for all paper and board stocks—outstanding soft texture, particle fineness and jet black color. Takes well to the fiber, shows high retention.

Best for performance in the Beater and Jordan because of ease of wetting and ready dispersion in the furnish.

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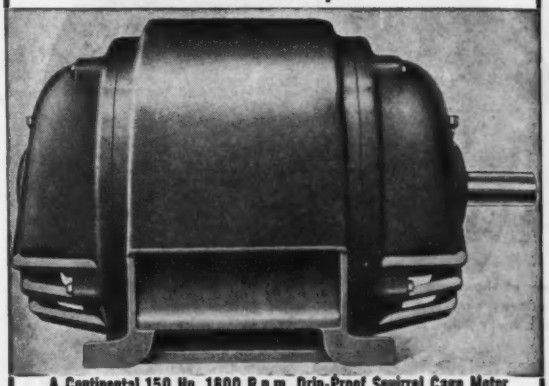
CANADA:
CANADIAN
INDUSTRIES, LIMITED

Continental

SQUIRREL CAGE MOTORS

1 to 600 Hp.



A Continental 150 Hp. 1800 R.p.m. Drip-Proof Squirrel Cage Motor

CONTINENTAL ELECTRIC CO., Inc.

Plants—Newark 5, N. J., Rockford, Ill.

Continental
ELECTRIC MOTORS

The Chief Speaks

Re-cover your present rolls with Chief Sandusky Centrifugally Cast bronze roll covers.

The fine uniform grain structure and accurate machining have resulted in Sandusky Centrifugal Castings being specified by the machine builders for years.

Sandusky Centrifugal Castings are also being used for applications such as pump liners, digester sleeves and bearing liners.

Discuss your requirements with your machine builder.

CHIEF SANDUSKY CENTRIFUGAL CASTINGS

SANDUSKY FOUNDRY AND MACHINE CO. SANDUSKY OHIO, U.S.A.

★

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HOWARD GERBER
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WILLIAMS-GRAY CO.

221 North LaSalle Street

Chicago Illinois

★

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Knox "Excelsior" Felts

Siamese & Richland Dryer Felts

Tensilastic Rubber Rolls

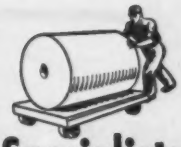
Splicing Tissues

Deckle Webbing

Etc.

★

CAMACHINE 18



Engineered by Specialists for Fast, Precision Winding

CAMACHINE 18 is largely used as the winding unit of paper machines and operates smoothly at speeds up to 2,000 F.P.M. in widths from 73" to 162"

In board mills and paper mills CAMACHINE 18 will give good service either directly behind the paper or board machine or as a rewinder in the finishing room. When handling board it will run smoothly at speeds up to 1,200 F.P.M.

CAMACHINE 18 will keep ahead of the fastest paper or board machine. At whatever speed it may operate it produces perfect rolls with cleancut edges and uniform density from core to circumference. Among its features are automatic counterweighting of riding roller to insure uniform density throughout entire diameter, drum grooving to prevent wrinkles, easy threading, etc.

Simple in design and construction, CAMACHINES are noted for their dependability in daily operation year in and year out.

GET FACTS! WRITE FOR THIS FOLDER

CAMERON MACHINE COMPANY
61 POPLAR STREET, BROOKLYN 2, N. Y.
MIDWEST OFFICE: 111 W. MONROE ST., CHICAGO 3, ILL.

KALAMAZOO GLAZED TILE TANKS and CHESTS

Enthusiastic reports and repeat orders are coming to Kalamazoo from America's largest and most progressive paper mills. They state Kalamazoo tile provides advantages in tank construction they have never before enjoyed.

They are clean—last longer—require less maintenance and handle stock faster.

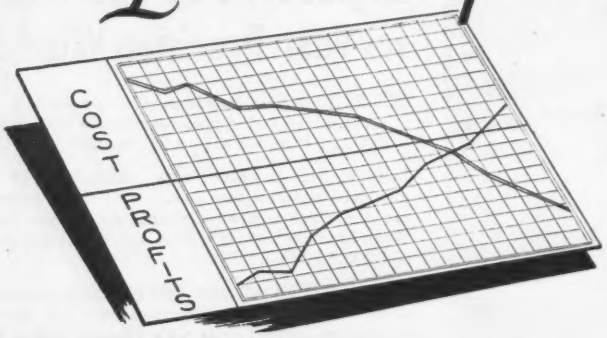
If you are planning new tanks, be sure they are Kalamazoo.

KALAMAZOO TANK & SILO CO.
Kalamazoo
Michigan

ANY SIZE
ANY SHAPE

Complete Erection Service

Lowered Production Cost...



IS A NATURAL GOAL OF EVERY MANUFACTURER

Competition is keen in the industrial world. Margins which were not so important during the past few years may now mean the difference between profit and loss.

Production Cost Analysis . . .

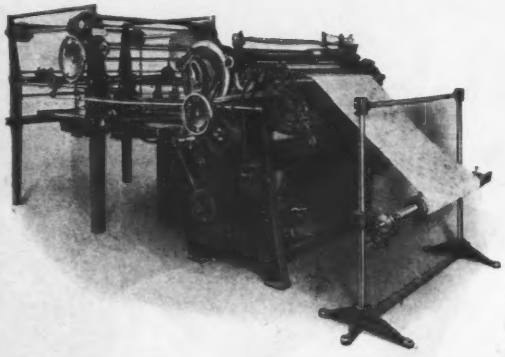
is one of the most important services we offer. We carefully analyze every production process and operation. If your production methods need analysis, your inquiries are cordially invited.

THE McPHERSON COMPANY
Greenville, South Carolina

Industrial Engineers

INDUSTRIAL SURVEYS • PLANT SITE INVESTIGATIONS • COMPLETE PLANT DESIGNS • APPRAISALS • VALUATIONS • LABOR SAVING STUDIES • RESEARCH & REPORTS • PROCESS ANALYSIS • PLANS

TEXTILE MILLS – BLEACHERIES – RAYON PLANTS – PULP & PAPER MILLS – DYE HOUSES – KNITTING MILLS – HOSIERY MILLS
WATER TREATMENT – INDUSTRIAL WIRING – STEAM UTILIZATION – WASTE DISPOSAL – ELECTRIFICATION



BECK SHEETERS with Sheet-Piler—
& ELECTRONIC EYE
may be had in widths up to 55".

For water-marked bank-check, as well as all other types of paper.

Accuracy coupled with speed are integral parts of these fully ball and roller bearing units.

May we quote you prices?

CHARLES BECK MACHINE CO.
418 No. 13th St. Phila. (8), Pa.

H. WATERBURY & SONS CO.
ORISKANY, N. Y.

Manufacturers of

WATERBURY FELTS

Since 1860

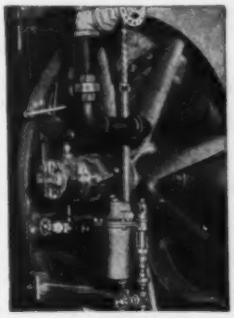
THE HAYDEN WIRE WORKS, INC.
Manufacturers of
BRONZE and BRASS WIRE CLOTH
West Springfield, Mass.
Cylinder Covering a Specialty

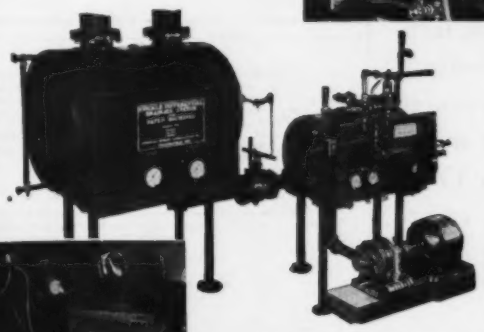
FOR TOP PERFORMANCE
CINCINNATI
RUBBER COVERED ROLLS
THE CINCINNATI RUBBER MANUFACTURING CO. CINCINNATI, OHIO

INCREASE PRODUCTION

. . . Save Steam, Save Fuel, Improve Quality

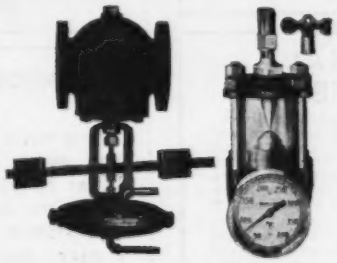
● Stickle Drainage and Control permits paper machines to be operated at, or near, potential capacities, and to produce a superior quality of product. Stickle Equipment reduces the amount of steam used, increases boiler capacities, and cuts fuel costs. Correct drainage at all pressures. Uniform drying at desired moisture content. Installations adapt system to requirements of operating conditions.

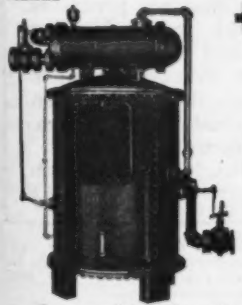




Individual dryer drainage (at top), or Differential Drainage (above), recommended according to operating requirements. Either type of drainage may be combined with Pumping Unit for returning condensate to boilers or feed water heater with minimum temperature loss. Fuel consumption reduced. Boiler capacity increased.

Stickle Tension and Thermal Control automatically retards or accelerates steam flow according to need of sheet established by predetermined moisture content.





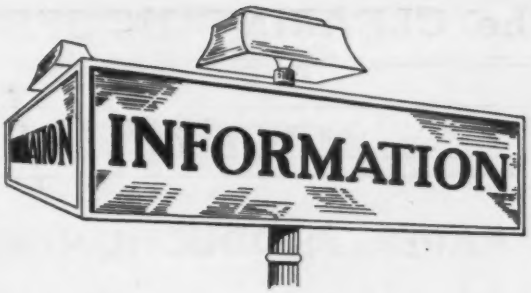
Automatic Differential Valve provides exact differential in pressure between two sections of machine, insuring proper drainage at all pressures. Micro Adjustable Orifice (with or without thermometer) supplies visible operation of syphons. Open Coil Feed Water Heaters in capacities to meet all needs.

For complete information and data on Stickle Systems for Paper Mills, and the individual specialties composing them, ask for Bulletin No. 160.

STICKLE

STEAM SPECIALTIES COMPANY

2215 Valley Ave., INDIANAPOLIS 1, INDIANA



More than ever, the attention of alert management is being directed toward the Southeast. Already, hundreds of industries have found advantageous locations here for expanding manufacturing and distributing facilities.

In planning your own program for utilizing the vast resources of the Southeast, you will need *facts, complete surveys, specific information,* to enable you to find the exact location best suited for your individual purposes.

Intimately familiar with this section, the Seaboard's Industrial Department is especially well equipped to supply the data you must have. A staff of trained specialists, with long and varied experience in assisting business concerns in these matters, is ready to help you gain the advantages which are to be found in our territory.

Your request for plant location information will be treated in strict confidence, promptly, and without obligation on your part. We invite your inquiry—simply address:

Dallas T. Daily
General Industrial Agent
Seaboard Air Line Railroad Company
Norfolk 10, Virginia

The CLEARING HOUSE

Address replies to advertisements appearing under Box numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York 18, N. Y.

Copy for Classified Advertisements must be in our office on Monday preceding publication

HELP WANTED

HELP WANTED

PAPER PRODUCTION MANAGER

This advertisement is intended to appeal to an ambitious man around forty who is presently doing a good job in directing paper mill production.

He should have several years experience operating paper board mills with a successful background in handling labor, engineering and planning of production. He has a well rounded knowledge of all elements essential to the management of a chain of three paper mills, the output of which is used in manufacture of the Company's major products. To the right man this offers opportunity for advancement in a large and fast growing organization.

Even though he now has a good connection he has a desire to improve his future and is looking for greater prospects elsewhere. If you are this kind of man your inquiry will be held in the strictest confidence. Address Box 46-704, c/o Paper Trade Journal. O-17

PLANT MANAGER—MECHANICAL ENGINEER

for large paper bag factory in New York City. Experienced in this line—must be capable of designing equipment and making improvements. Understand printing, also handling labor, etc. Age 35 to 45 years. Excellent opportunity. State qualifications and salary. Replies confidential. Address Box 46-696 care Paper Trade Journal. O-17

SALARIED POSITIONS

$2,500-$25,000. This thoroughly organized confidential service of 30 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity assured and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
117 Dun Bldg., Buffalo 2, N. Y.

WANTED

Sales engineer to represent long established eastern paper mill machinery manufacturer, must have thorough knowledge of paper mill equipment also free to travel; would consider former paper mill superintendent or maintenance engineer. Reply by letter, specifying age, experience, qualifications, how soon available, also salary expected. Address Box 46-685 care Paper Trade Journal. O-17

ENGINEER-DRAFTSMAN

For Paper Mill in Massachusetts. Young man 25-30 years of age. Good appearance and personality. Preferably with some paper mill experience. Salary $225.00-$250.00 per month. Address Box No. 46-676 care Paper Trade Journal. O-24

CHARLES P. RAYMOND SERVICE, Inc.

294 Washington St., Boston, Mass.

Specializing in Paper Mill Personnel
Positions Now Open.

- General mill superintendent, superintendent for specialty papers, industrial engineer and plant engineer for mills in Canada
- Superintendent cylinder machine sulphite and groundwood mill
- Woodlands manager
- Master mechanics, assistant master mechanics, plant, mechanical and industrial engineers
- Assistant coating mill superintendent
- Technical director light weight tissues
- Salesman sulphate papers
- Draftsmen and designers
- Tour boss for So. America
- Cylinder and fourdrinier machine tenders, tour bosses and back tenders
- Beater Engineers
- Chemists and chemical engineers

We invite correspondence (Strictly Confidential) with paper and pulp mill executives seeking new positions and with employers seeking new personnel. O-10

CHEMICAL ENGINEER

sought for responsible position in development engineering by prominent firm with midwestern plant and laboratories. Broad training in fundamentals of chemistry and engineering required. Experience in design of industrial equipment desirable. Background in paper converting helpful but not essential.

This position offers a unique opportunity for advancement in the expanding engineering activities of a sound corporation with broad technical interests and stimulating leadership.

Please give detailed information in reply. Address Box 46-711 care Paper Trade Journal. O-10

PROCESS ENGINEER

Wanted

With wide experience in pulp and paper making processes. Must be able to develop flow diagrams and specify related equipment. Excellent opportunity for the right man. Please furnish complete experience record.
Address Box 46-261 care Paper Trade Journal. TF

GUMMING SUPERVISOR—Wanted by large well established paper converter. Should have practical experience in production of gummed paper and cloth tapes and gummed specialty papers. Give full details of qualifications and experience. Address Box 46-612 care Paper Trade Journal. D-19

PERU, SOUTH AMERICA—Opening for experienced Tour Boss under 50 to work on cylinder and fourdrinier machines in a board and tissue mill; three year agreement; transportation and modern homes provided for employees and families; special school for younger children; moderate climate. Address Box 46-659 care Paper Trade Journal. O-10

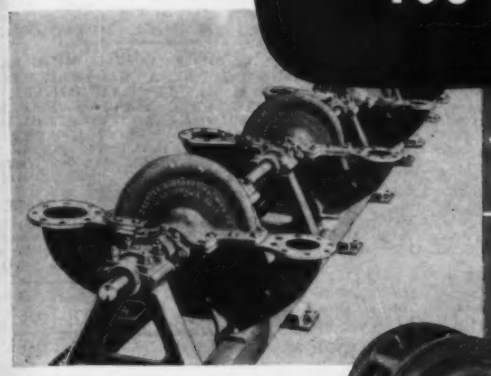
PAPER CHEMIST—With knowledge of and preferably experience in converting and sheet forming processes. Good opportunity in research laboratories of resin manufacturer. Location East. Write giving full information regarding training, experience, age, salary expected and include snapshot. Address Box 46-702 care Paper Trade Journal. O-17

WANTED—Experienced draftsman, New England pulp and paper mill. Address Box 46-705 care Paper Trade Journal. O-17

WANTED—Young Man to manage small mill paper jobbing business. Wonderful opportunity for right man. Reply in complete detail. Address Box 46-695 care Paper Trade Journal. O-10

COLLEGE GRADUATE-MECHANICAL ENGINEER—25-30, two or more years practical experience sulphate mill operation. Position with consulting engineering firm. Only those having qualifications noted will be considered. Address Box 46-714 care Paper Trade Journal, giving education, experience, salary required. O-24

A THOUSAND TIMES YOU'VE HEARD IT



OLD FAN PUMPS — NOW OBSOLETE — SHOULD BE REPLACED

MIAMI CLASS "A" FAN PUMP . . . FOR GREATEST EFFICIENCY

A THOUSAND times you've heard: "Out with the old, in with the new." *And it's still mighty good advice.* The old and new pumps above illustrate the point.

Good advice, for how can "up-to-standard" paper roll off an obsolete or worn-out paper machine, served by preparation equipment that also needs replacing?

The time is fast approaching when *quality* will again be "king"—and with deliveries of equipment the way they are, there certainly is not much time to lose.

If B-C-S-D engineers can be of help, feel free to call them in.

MIAMI PUMP LINE

Centrifugal pumps (horizontal and vertical) to meet all mill requirements — Agi-flo combination pump and agitator; propeller agitators; plunger type stock pumps.

SHARTLE BROS. MACHINE CO.

MIDDLETOWN, OHIO

Dilts

DILTS MACHINE WORKS, FULTON, NEW YORK

Divisions of The Black-Clawson Co., Hamilton, Ohio

SITUATIONS WANTED

ENGINEER-OPERATOR

With wide experience in stock preparations, mill design and operation for specialty papers and for board.

Can select most efficient equipment and supervise layout to make high grade wall board from many kinds of wood.

Box 46-672 care Paper Trade Journal. O-31

ENGINEER will be available for new assignment November first on consulting or temporary employment basis. Broad experience in felt, board, asphalt roofings and allied products. New construction, modernization, operation and economic problems. Will prepare Studies, reports, plans, specifications and supervise entire projects. Address Box 46-644 care Paper Trade Journal. O-10

SUPERINTENDENT—30 years experience in light weight crepe tissues and towels. Capable of production and all maintenance on cylinder, Yankee pickups and Fourdrinier machines. References furnished. Address Box 46-619 care Paper Trade Journal. O-10

MILL REPRESENTATIVE covering the job bing and direct trade for the past 15 years from Pennsylvania through to the Carolinas, now desires to operate over the same territories with 2 or 3 non-conflicting lines. What have you to offer? Address Box 46-412 care Paper Trade Journal. TF

SITUATIONS WANTED

CHEMIST—with six years experience desires position of responsibility in Fine Paper Mill. Experienced in Manufacture of Cigarette, Carbon, Bond Banknote papers. Supervision of Cooking, Bleaching of Flax, Hemp and Cotton. Accommodations for family essential. Address Box 46-673 care Paper Trade Journal. O-24

FOURDRINIER MACHINE TENDER desires position with promotion possibilities. Young, 34, ten years experience all grades, technical training, references. What have you to offer? Address Box 46-674 care Paper Trade Journal. O-17

MECHANICAL ENGINEER—20 years experience, plant design, process development, erection, cooperative reliable character, excellent references, now employed, seeks position offering better opportunities. Address Box 46-681 care Paper Trade Journal. O-17

FINISHING DEPT. or Converting Mgr., Sheeting, Cutting, Rewinding, Packing, Printing, Bond, Kraft, Specialties, Tissues, Waxed, Shipping, Scheduling. Years practical experience. Address Box 46-683 care Paper Trade Journal. O-10

FELT MILL SUPERINTENDENT — Exceptional experience. Rebuilding—operation—consulting. One of the best men in the industry. Address Box 46-699 care Paper Trade Journal. O-24

EXECUTIVE POSITION by mature, technically trained man, experienced in manufacturing, management and sales. Address Box 46-687 care Paper Trade Journal. O-24

SITUATIONS WANTED

PLANT MANAGER—Thorough experience in converting paper and boards; wants change to position offering better opportunity. Excellent production and labor relations background. Address Box 46-694 care Paper Trade Journal. O-31

FOURDRINIER EXECUTIVE — Ten years with one of America's foremost mills. Experience covers control and color work. Highly trained. Address Box 46-700 care Paper Trade Journal. O-24

TECHNICAL DIRECTOR — MILL MANAGER WILL BE AVAILABLE WITHIN 30 DAYS. BROAD EXPERIENCE IN LAMINATING AND COATING. EXPERIENCED IN PRODUCTION, CONTROL, DEVELOPMENT AND SALES RESEARCH. COMPLETE REFERENCES FURNISHED. ADDRESS BOX 46-697 care PAPER TRADE JOURNAL. O-24

CHEMIST, EXPERIENCED raw MATERIALS, PROCESS, and PRODUCT control. West or Southwest preferred, but not essential. Address Box 46-703 care Paper Trade Journal. O-24

FOR SALE

FOR SALE—50" Seybold Automatic Clamp Cutter, thoroughly rebuilt and fully guaranteed. Address Box 46-713 care Paper Trade Journal. O-10

FOR SALE

BEATERS
1—2000 lb. Holyoke-Iron Tub Beater.
2—1200 lb. E. D. Jones (no tubs).
1—1000 lb. Dayton Beater (no tub).
1—400 lb. Gavit—iron tub beater.
1—Breaker Beater—Dilts Bandless Roll 62" diameter x 54" face—70 tons daily capacity. Equipped with Shartle Bros. Ragger.
1—Bandless Breaker Beater Roll, 60" diameter x 54" face.

BLOWERS
2—Buffalo Forge Company—Size 7—Duplex Conoidal steel plate Blowers. Ball bearing.

CALENDER STACKS
1—5 roll 84" face—Farrel.
1—6 roll—72" face.
1—7-roll 36" Holyoke Machine. (supercalender)

CENTRAP
1—Shartle Brothers Centrap.

COATING MACHINE
1—26" six roll coating machine.

CYLINDER MOULDS
1—30" diameter x 74" face.
3—30" diameter x 54" face.
1—39" diameter x 75" face.
1—36" diameter x 84" face.
1—36" diameter x 80" face.
2—36" diameter x 72" face.
4—30" diameter x 72" face.

DOCTORS
14—Dillon Doctors—complete with accessories—98" face.

DRIVES
4—Smith & Winchester Drives.
1—Moore & White mortise gear drive.
1—D. O. James 75 H.P. Speed Reducer with couplings and motor base. Ratio 2.16 to 1. 900 RPM to 418 RPM.
7—D. O. James Angle Drives—11 to 1—12 to 18 h.p.
1—#7½ Reeves.

DRYERS
16—36" diameter x 115" face.
1—28" diameter x 76" face.
1—48" diameter x 94" face.
1—24" diameter x 84" face. (Baby)
8—36" diameter x 64" face, with frames gears and bearings.
2—25" x 120" (Baby Dryers).
1—48" x 108".
1—36" diameter x 38" face.

ERKENSATORS
1—I. W. E. Erkensators—bronze construction—complete with motors, starters and distributing box.

FLAT SCREEN
1—4 plate Flat Screen.

HYDRAULIC PRESSES
1—Lake Erie Engineering Co., 78 ton, platen 12" x 12".
1—Watson Stillman, 60 ton, platen 14" x 14", with triplex pump and motor.

JORDANS
1—No. 2 Miami Jordan.
1—No. 9 Emerson Jordan—for direct connection to a motor.
1—Noble and Wood. Monarch, new fillings.
1—#2 Emerson, with 125 h.p. motor.
2—Noble & Wood, Pony Monarch, Belt Driven.

MOTOR
1—25 h.p. motor, including starting equipment.

PRESS ROLLS (Rubber Covered)
1—27¼" diameter x 186" face.
1—26" diameter x 185" face.

PULP EQUIPMENT
1—32" three pocket Glens Falls Grinder (for 27" wood).
1—4 knife Carthage Chipper, with 2 sets of spare knives.

PULP SCREEN
1—IMPCO centrifugal pulp screen design No. 3.

PULPER
1—Jones Pulper.

PULVERIZER
1—Erie coal pulverizer.

PUMPS
1—6 x 2L Connersville Vacuum Pump.
1—No. 7 Sturtevant Vacuum Pump.
1—Buffalo Pump—5500 g.p.m. direct connected to 100 H.P. Motor (50' head).
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.

RAG CUTTER
1—Taylor Stiles, 14", Little Giant.

REDUCERS
2—Westinghouse Gear Motors—25 h.p.—115 output r.p.m.—3/60/440.

REELS
1—72" Downingtown Expansion Reel.
1—2 Bowl Reel — 112" face — bowls 20" diameter.
1—2 Bowl Reel—110" face.
1—Set Stack Reels, capacity trim 143".

ROLLS
500—Brass tube—steel tube—rubber covered iron rolls—various sizes.

ROTARY SCREENS
3—Moore & White Rotary Screens (alternating diaphragm type).

SAVEALL
1—Saveall 36" diameter x 96" face cylinder mold. (With iron end vat.)

SCREEN PLATES
36 plates—43 x 11⅛"—.030 cut—bevel edges.
24 plates—Recently recut .008.
12 plates—Recently recut .035.
Also other sizes and cuts in stock.

SHREDDERS
1—No. 23 CRSE Mitts & Merrill Hog.
1—Gilman Shredder.
1—Waterville Shredder.

SHEETERS
1—128" Moore & White Sheeter with layboy.
1—48" Langston heavy duty chopper (this is a combination machine, combining a slitter, scorer, sheeter and chopper.)

SLITTERS AND WINDERS
1—36" Beck Razor Blade type Slitter & Winder.
1—60" Moore & White Slitter and Winder set for 5/4" slits.
1—60" Moore & White Slitter and Winder set for 7/16" slits.
1—120" Moore & White 4 drum slitter.
1—80" 2 drum Warren Winder.

STOCK PUMPS
1—7¾ x 12 duplex Moore & White.
1—12 x 20 Triplex Shartle.
1—8 x 18 Duplex Friction Co.
1—10 x 12 open impeller. (All lead).
Numerous other Centrifugal Stock Pumps Advise as to your requirements.

SUCTION BOX
1—Nash 100" face Suction Box

SUCTION FELT ROLLS
2—Downingtown, 10" diameter x 100" drilled face.

TOILET AND TOWEL MACHINES
1—65" Towel Machine.
1—85" Toilet Machine.

V-BELT DRIVES
1—{23" diameter x 14" face, 10 grooves.
{15" diameter x 14" face. 10 grooves.

VACUUM PUMPS
2—#4 Nash Hytor.
1—6 x 2L Connersville Vacuum Pumps.
1—No. 7 Sturtevant Vacuum Pump.

WET MACHINE
1—74" Moore & White.

We are always in the market to purchase your surplus or idle machinery. What have you to offer? Wanted Cylinder and Fourdrinier Machines (complete mills).

Paddy Ross, Pres. **J. J. ROSS COMPANY** Ben Kurs, Treas.

250 Frelinghuysen Ave. **Tel.—Bigelow 3-3720** **Newark 5, N. J.**

TELEPHONE
HUMBOLDT 2-2177

CABLE ADDRESS: JACK ROSS

ROSS PAPER MACHINERY CO.

265 PASSAIC STREET
NEWARK 4, N. J.

CONVERTING
PAPER MAKING EQUIPMENT

NEW, USED, REBUILT
PAPER AND PULP MACHINERY

JACK ROSS, President

1—Shartle Brothers 2 cylinders—120" machine. (Can supply four additional cylinders and vats). Machine includes:—2 pairs of baby presses, 3 pairs of primary presses, 2 pairs of main presses, 27 dryers 36" diameter x 115¼" face—3 deck—spare cylinder mould and couch. Drives, stands, line shaft and pulleys. Blue prints available.

1—Farrel Birmingham 16" Asphalt Extruder Complete.—Used 7 months.

AIR HOISTS
2—Two-Ton Ingersoll Rand
2—Five-Ton Ingersoll Rand

BEATERS
2—1000 lb. Horne Iron Tub.
2—1200 lb. E. D. Jones Iron Tub Beaters with washers.
2—1200 lb. E. D. Jones Beater—no tubs.
3—Valley Iron 750 lbs. Iron Tub Beaters, with Silent Link Belt Drive.
1—1200 lb. Noble and Wood—no tub. Spare new fillings for roll.

BIRD SCREEN PLATE
17 Plate—60 cut. New condition.

BLEACHERS
2—Fletcher high density bleachers—used 3 months.

BLOWERS
1—American ball bearing blower, size 17" x 23" for motor drive.
1—American Blower, size 40. For belt drive.

CALENDER DOCTORS
1 set of 18 Warren Doctors 104" face with frames.
60 Warren Doctors—various sizes.

CALENDER ROLLS
30 rolls various sizes

CALENDER STACKS
1—6 roll Beloit, 110" face.
2—2 roll Holyoke 36" face.

CONVERTING EQUIPMENT
1—Sanitary Napkin Machine. With motors and starters.
1—Bliss Double Head Stitcher.

COUCH ROLLS
2—18" diameter x 92" face—brass covered.
3—20" diameter x 92" face—brass covered.

CREPING MACHINE
1—Complete Bagley & Sewall Creping Machine. Dryer 100" face x 48" diameter. Ball bearing equipped. Used 6 months.

CYLINDER MOLDS
3—Impco—84" face—40" diameter with stainless steel face wire
2—110" face x 36" dia.
4—84" face x 36" diameter.

DANDY ROLLS
1—122" face 10" dia.
1—128" face 12" dia.
1—129" face 9½" dia.

DRIVES
1—Falk 25 h.p.—7.5 to 1.—1750 r.p.m.

DRYER DOCTORS
40—Warren Doctors. Various sizes.

DRYERS
35—48" Dia. x 40" Face, Chromium Plated.
2—24" Dia. x 46" Face.

ELECTRIC HOIST
1—Sprague Electric 3 ton hoist—5 h.p. 3 phase—60 cycle—110 volts.

FLAT SCREENS
3—Harmon 15 plate.
4—Harmon 10 plate.
1—6 plate Sandy Hill Packer—roller shoes.
1—Sandy Hill 2 plate flat screen.

FOURDRINIER SHAKES
1—Beloit Fourdrinier Shakes.
1—Sandy Hill Bertram Shake. Late type.

FOURDRINIER WET END
1—120" Beloit Fourdrinier Wet End.
1—74" Pusey & Jones Wet End.

GRANITE ROLLS
2—112" face 20" diameter.

HAMMERMILLS
1—American Hammermill—37" anti friction bearing equipped.
1—Williams 18" Hammermill Ball Bearing.

HOG
1—Mitts & Merrill Hog. Number 5Z52.

JORDANS
2—E. D. Jones Majestic Jordans, with one new set of fillings for both plugs and shell—belt driven.
2—22 Miami Jordans—motor driven.
1—E. D. Jones Imperial Jordans—belt driven.
1—Smith & Winchester 30 ton capacity—belt driven.

LINE SHAFT
1—Complete line shaft with pullays and pillar block.

PLATERS
2—Holyoke 2 Roll 18" dia. 36" face.

PULLEYS
60—Cone Split and Solid Cast Iron Pulleys. Various Sizes.

PULP SCREENS
4—Wells Screens.
6—Trimbey Screens.

PULP EQUIPMENT
1—120" face Kamyr Press.
1—84" Sumner Disc Barker with motor.

PULPERS
1—Voith Pulper 20 tons cap.
1—Bird Pulper.

PUMPS
4—Ingersoll Rand 250 g.p.m. 1740 rpm 90' head —4" suction—3" discharge. Direct connected to 10 hp. General Electric 220-440 volt—3 phase—60 cycle motor.
4—Ingersoll Rand 500 g.p.m. 1745 r.p.m.—80' head—4" suction—3" discharge. Connected to 15 h.p. General Electric 220-440 volt—3 phase—60 cycle motor.
4—Worthington Pumps 10,000 g.p.m.—35' head. Requires 75 h.p. at 550 r.p.m.
1—DeLaval 6" x 6".
1—DeLaval 1800 g.p.m. 30' Head, 500 r.p.m.—8" Suction—10" Discharge, Ball Bearing—Belt Driven—or for Direct Connection to Motor. Open Impellor.
2—Worthington Close Coupled Centrifugal Pumps. 6" x 6" 650 g.p.m. 25' head. 6 h.p. Star Electric splash proof motor. 1750 r.p.m. 440 volt, 3 ph.-60 cycle, ball bearing.
16—Warren Vertical Pumps. 6" suction. 5" discharge. 135 g.p.m. 80' head. Direct Connected 6 h.p. General Electric motor. 1780 r.p.m. 440 volts, 3 ph.-60 cycle, ball bearing.
1—Warren Close Coupled Centrifugal Pump. 3" suction. 2" discharge. 60 g.p.m. 90' head. 6 h.p. General Electric 1750 r.p.m. 440 volts, 3 ph-60 cycle, ball bearing.
2—Worthington 3". 2 stage. 200 g.p.m. 224' head. Bronze Ball Bearings.
1—Worthington 400 g.p.m. 35' head 1750 r.p.m. Ball bearing.
2—La Bour Company self priming ball bearing pumps. 2½" suction. 2½" discharge. 150 g.p.m.—30' head with extended base for motor.
295 additional pumps in our warehouse—various sizes.

REELS
1—Black-Clawson 2 Bowl—120" face. Takes 36" diameter roll.

REFINERS
1—Weiner Refiner 24" with extended base for direct connection to motor.

ROLLS
40—Table, Dress, Felt, Wire, Breast and Calender Rolls. Various Sizes.

ROTARY COOKER
1—Rotary Cooker—6' dia. x 21' long—complete with drive.

ROTARY SCREENS
2—22 Bird with copper vats.
2—21 Bird with steel vats, lead lined.
4—Moore & White.

RUBBER PRESS ROLLS
1—130" Face—29" Diameter } Used 20 Days
1—148" Face—27½" Diameter }
1—119" Face—19½" Diameter.
1—100" Face—17½" Diameter.
1—120" Face—19" Diameter.
1—118" Face—18" Diameter.
1—120" Face—18" Diameter.
1—107" Face—18" Diameter.
1—106" Face—18¼" Diameter.

SAVEALLS
1—A. D. Wood cylinder 48" dia. 66" face.

SCREW PRESS
1—Valley Iron Screw Press. Used 2 years.

SHEETERS
1—86" Hamblet Duplex.
1—80" Beloit Single Knife heavy duty.

SHREDDERS
3—24" Sprout Waldron heavy duty shredders—anti friction bearing equipped.
1—Taylor Stiles Portable Pulp Shredder—on wheels.
1—Rythor and Pringle Shredder.

SLITTERS AND WINDERS
1—82" Warren two drum—fully rebuilt.
1—41" Waldron Slitter and rewinder. Roll embossing attachment.

STEAM LOCOMOTIVES & WOODLAND EQUIPMENT
1—32 ton 36" gauge Shay-Lima locomotive. Air pressure 150 lbs. P.S.I. with a large lot of new spare parts.
1—40 ton 36" gauge Improved Climax Locomotive. Boiler pressure 150 lbs. P.S.I. with a large lot of new spare parts.
30—36" gauge wood cars. 40,000 lbs. log or pulpwood capacity. Used 4 months.
1—Sheffield motor car, manufactured by Fairbanks Morse—36" gauge—New.

STUFF PUMPS
1—12" x 20" Shartle triplex.

SUCTION BOXES
3—Brass Suction Boxes—116" face—8" wide—adjustable.

SUPERCALENDER STACKS
1—9 roll Norwood 82" face. Bottom roll 24" diameter. Top roll 20" diameter.

TURBINES
1—Westinghouse 125 h.p. 125 steam pressure—15 back pressure. Complete. Used 1 year.

TURBINES—PAPER MACHINE DRIVE
2—General Electric Turbine Paper Machine Drive 250 h.p.—350 r.p.m. 125 lb. steam pressure 30 lb. back pressure.

UNWINDERS
1—42" John Waldron Unwinder. Used 1 year.

VACUUM PUMPS
3—14" x 20" Connersville.

WET MACHINES
2—Glens Falls 84" Wet Machines—cylinder mold 36" diameter with 18" rubber couches.

YANKEE DRYERS
2—Beloit 8' dia. x 175" face—75# working pressure.
1—Beloit 5' dia. x 194" face—75# working pressure.

THE ABOVE IS A PARTIAL LIST OF EQUIPMENT OFFERED FOR SALE.
NO CONNECTION WITH ANY OTHER FIRM OF SIMILAR NAME.

FOR SALE

FRANK H. DAVIS CO.,

ESTABLISHED 889

USED AND REBUILT PAPER MACHINERY.

FOR SALE

BARKERS
1—48" Waterville
BEATERS
2—Holyoke 66 x 60, iron tub
1—2000 lb. Horne, iron tub Broke Beater new 1941, roll bandless 60 x 48
1—Horne patent 60 x 60, bronze bars
CALENDER
Set of 124" rolls, bottom 22"; 2-16"; 8-12"
CUTTERS
1—110" Hamblet duplex
1—94" Clark with Moore & White layboy
1—63" Smith & Winchester undercut
1—Taylor Stiles rag cutter
1—Daniels rag cutter
DECKERS
1—30 x 95 Black & Clawson
1—30 x 74" Impco
3—Apmew Filters, mould 50" x 100"
DRYERS
1—6' x 86"; 1—6' x 102"; 1—6' x 106"
2—8' x 175"; 1—5' x 194" new 1939
EMBOSSERS
1—80" Hudson Sharpe Embossing Machine
FANS
2—Buffalo double turbo 6½ Conoidal forced draft fans
JORDANS
2—Union Standard for motor drive
1—N & W Pony Monarch
1—Claflin #2
FOURDRINIER PARTS
1—Rice Barton, wire 100" x 31', rebuilt with 2 Reeves drives
1—Pusey & Jones, wire 133" x 61' 2", running at 500 F P M
1—40"
1—22 x 104 Suction couch.
1—14½ x 60" Suction couch.
LOCOMOTIVE
1—Alliance, also 7000 feet of 60 lb. track with connections
MIXER AND COOKER
1—25 gallon cooker #75
PULPERS
1—21 Lannoye
2—Jones with Falk reducers and motors 440 volts, 3 phase, 60 cycle
1—Lannoye #2
PUMPS
1—10 x 10 Beloit triplex
2—10 x 12 Deane
1—27 14 x 20 Roots vacuum pump, bronze fitters
SCREENS
2—Bird #2
2—Bird #2A
2—Moore & White #2
1—Leith Walk
4—12 plate Packer
2—10 plate Impco flat, bronze vats, new 1940
6—14 plate Impco flat, bronze vats, new
2—6 plate; 1 roller shoe
4—New 10 plate, Witham vats
2—New 8 plate, Witham vats
SHREDDERS
2—Mitts Merrill #15 C.F. direct cont. to 125 H.P. 440 v. motor
1—Waterville
1—Carthage
1—Rythor & Pringle Mitts Merrill type 14A P E S #C 19026
SLITTERS
1—150" Moore & White four drum
1—120" Kidder two drum
1—114" Moore & White four drum, wide 60" roll
1—84" Bagley & Sewall
1—80" Cannard
1—28" Kidder two drum
1—110" four drum.
WASHERS
2—2000 lb. Union Mach. steel tubs

Builders of

ASPHALT COATING, COMBINING MACHINE, GUMMING AND CREPING MACHINE, ROLL GRINDER

FRANK H. DAVIS COMPANY
175 Richdale Ave., Cambridge, Mass. TF

FOR SALE

BREAKER BEATER

1—Dilts Bandless Roll 62" diameter x 54" face—70 tons daily capacity. Equipped with Shartle Bros. Ragger.

J. J. ROSS COMPANY
250 Frelinghuysen Ave., Newark 5, N. J.
Tel. Bigelow 3-3720 O-10

FOR SALE

REVAMPING AND REBUILDING MILL AND CAN OFFER FOR SALE

1—Noble & Wood Mammoth Jr. Jordan ½" Filling. Now operating.
1—Brass covered finishing press roll—17¾" diameter x 88½" face, complete with bearings and Noble & Wood friction drive.
1—4000# Capacity motor driven freight elevator with automatic stop control—can be inspected in operation at our plant.
1—6" Lawrence Centrifugal Water pump.
2—8" Barnes Centrifugal Sewage Pumps.
8—100" Screen plates for No. 2-A Bird Screen. Slots. .022—never used after being reset once.
1—Rubber covered press roll 12" diameter by 68" face—Journals 5" diameter by 7¼" long.
1—Rubber covered press roll 12" diameter by 84¼" face—Journals 5" diameter by 7¼" long.
1—20" face cast iron tapered pulley—2 15/16" Bore, Taper 31"-29½".
2—20" face cast iron tapered pulley—3 7/16" Bore, Taper 31"-30".
1—24" face cast iron tapered pulley—3 7/16" Bore, Tapered 31⅝"-29⅝".
3—Steel split pulleys 60" diameter by 31" face —5 15/16" bore.
1—Cast iron split pulley—60" diameter by 21" face by 3½" bore.
1—Cast iron split pulley—40½" diameter by 21" face by 3½" bore.
1—Cast iron split pulley—84" diameter by 36" face by 5 15/16" bore.
1—Cast iron split pulley—72" diameter by 18" face by 16" face by 8⅝" bore.
2 —Steel split pulleys—60" diameter by 41" face by 5 15/16" bore.
1—Paper pulley—24" diameter by 21" face by 4½" bore.
1—Tapered cast iron split pulley. Taper 30" to 28½" by 20" face by 3 15/16" bore.
1—30" x 90" Cylinder mould—7" diameter shaft inside cylinder.
1 9½" diameter x 88" Face Rubber-covered squeeze or wringer roll-Journals 1 15/16" diameter.
1—8" diameter x 88" Face Calender roll—8" diameter journals.
18—4½" dia. x 92" face steel drier felt rolls with 1 7/16" x 8½" Journals.
2—4" Gould centrifugal stock pumps with 2 vane open impeller. Capacity 600 G.P.M. at 40' head—1175 R.P.M. with 10 H.P. Operated less than two years.
2 —Pair Noble & Wood lighter stands complete with lighter beams and bearings for 8" diameter journal beater roll.

A visit to the mill would prove profitable as we have many items for sale too numerous to mention. See our superintendent, Mr. O. F. Fussell at our plant in Walloomsac, N. Y.

WALLOOMSAC PAPER MILLS, INC.
Mills: Walloomsac, New York
Main Office: 25 Vanderbilt Avenue
New York 17, N. Y. TF

GOOD VALUES FOR THE PAPER MILL

68" Rice, Barton, Fales Slitter-Rewinder.
80" and 110" Mill Type Sheeters.
34" Inman Slitter.
54" Brown & Carver Power Cutter.
13 x 19 Miller High Speed with swing back feed.
36" Burton Slot-hole Perforator.
2—14" x 22" John Thomsons.
Robinson Double Corner Cutter.
American heavy duty Cross-Cut Saw.
Baling Presses—NEW—Hand and Power.

THOMAS W. HALL COMPANY, INC.
120 West 42nd St., New York 18

FOR SALE

2—TS-16 — 400 HP — G.E. Motors — 450 RPM—2200 V—3 PH—60 Cycle—0.8 P.F.—40°C. Rise — Drip Proof — Self Ventilated—Enclosed Collector Rings—50% Starting Torque—50% Pull-in Torque—150% Pull-out Torque—With Direct Connected Exciter. These are brand new motors of 1946 manufacture and have never been removed from their original shipping crates. Subject to prior sale. Please address replies to Paper Trade Journal, Box 46-709. O-24

FOR SALE—Electric Hoists, new, in stock. Shaw-Box 100 lbs. and 4000 lbs. capacity. "Budgit" 250, 500, 1000 and 2000 lb. capacity. I-Beam Trolleys and Cord Reels. Mansel L. Rankin, 1741 Columbus Ave., Sandusky, Ohio. Phone 481. O-10

FOR SALE—One 38" two color Rotogravure Press. Sheet feed and pile delivery. Practically new. Address Box 46-541 care Paper Trade Journal. TF

FOR SALE

"CALL MOORHEAD IN PITTSBURGH REBUILT ELECTRIC EQUIPMENT"

REBUILT ELECTRICAL MACHINERY

Slip ring & Squirrel cage motors

HP	Make	Speed	Voltage	Type
20	G.E.	900	220/440	KT
40	G.E.	870	220/440	MTC
40(2)	G.E.	600	220/440	M T
100	F.M.	1200	220/440	KT
100	West.	1750	2200/220/440	CI
150	West.	600	440/220	Syn.
200	West.	600	220/440	Syn.
200	G.E.	240	2200	MT412
300	G.E.	700	220/440	M
300	West.	1750	2200/220/440	CW
350	G.E.	900	440	I-M
350	Al.Ch.	720	440	S.R.
500	G.E.	450	2200	MT412

AC and DC Generating Equipment

1—300 KW G.E. R. Converter 250 v. DC.
200 KW West. 250 v. DC—2200 v. AC
50 KW G.E. 125 v.—75 HP 3 ph.
15 KW G.E. 250 v. DC—220/440 v.
1000 amp. Westgh. SK Arc Weld Gen.
75 KW 250/275 v. West. Type S 1000.
45 KW West. SK 125 v. 700 RPM.
50 KW Westgh. Turbo 125 Volt D.C.
50 KW Westgh. Engine unit 125 v. D.C.
75 KW G.E. 250 v. dir. con. 4 cyl. Bessemer Diesel Eng.

Miscellaneous

1300 cu. ft. 100#. Worth. Belted, Comp.
220 cu. ft. Ing. Rd.-Gasoline Comp.
270 cu. ft. Chic. Pneu.-Gasoline Comp.
164 cu. ft. Chic. Pneu. Steam Comp.
500/700 HP Morse Chain Drive 4.28 to 1.
250 HP Ottumwa Unit 12.5 to 1
150 HP G.E. unit ratio 3 to 1
150 HP Nuttall 1.6 to 1
2—50 HP Ohio Forge ratio 45 to 1.
2—1 Ton Gib AC Cranes 35' swing.
1½-Ton AC Boom Hoist 220/3/60
5-Ton Shep. AC, 35' 9¼" span, 3 motors.

MOORHEAD-REITMEYER CO., INC.
30th & Brereton Sts. Pittsburgh, Pa.

Specializing in rebuilt Electrical Machinery for over a Quarter of a Century.

FOR SALE

New brass covered felt or wire rolls 6½" dia., 84 to 120" face. These are made from government surplus and are new in all respects.

Osborne Paper Mill Equipment Co.
Fulton, N. Y. TF

FOR SALE

One 60-ton capacity Shartle Brothers continuous breaker beater with perforated backfall, overall length of Tub 39'6", width of rolls 58", diameter 60", regular Shartle steel shaft and built-up roll, hollow mid-feather. Available for immediate shipment. Now in operation but will be shut down within a week. Address Box 46-712 care Paper Trade Journal. O-31

OFFER—180 Copper Covered Steel Beater Bars, 6" wide x 60" long. These are new bars and were purchased for Umpherston beaters. Address Box 46-717 care Paper Trade Journal. O-31

FOR SALE—Cellophane. Available in small cut size sheets, either moistureproof or plain. Fairly prompt delivery. Address Box 46-603 care Paper Trade Journal. TF

FOR SALE | FOR SALE | FOR SALE

TARENTUM PRODUCTS CORP.

TARENTUM, PENNSYLVANIA

1—Majestic Jordan #A-235, complete with new filling, 3/16" tackle, No. 6 Fast Jordan Coupling, and following drive:

1 Westinghouse Induction Motor type CS 375 HP 2300 volts 3 phase 60 cycles 97 amp. 380 RPM Ser. #1463196 complete with one control panel, including one Westinghouse 300 amp. Oil Circuit Panel.

1 set Disconnect Switches.

1—Westinghouse DC Motor 75 HP 230 volts 265 amp. 575 RPM Frame 183 Ser. #4778500. Complete with starting control, circuit breaker and motor.

1—Elliott Water Pump, capacity 500 gallons per minute, serial #37075. Direct connected to one G.E. Motor 25 HP D.C. Type CD 85-230 91.3 amps 1730 RPM Ser. #1530365. Complete with one starting control and switch.

1—Westinghouse Generator 70 KW 250 volts DC 280 amp. 375 RPM Ser. #345451 with one Field Rheostat, one two-pole circuit breaker 600 amp., one Westinghouse 600 amp. amotor and shunt. This Generator driven by Buckeye Steam Engine, 100 lbs. steam pressure engine #5156.

1—2000 KW A.C. Turbine Generator complete with all accessories.

1—Allis-Chalmers Induction motor 250 HP 870 RPM 2200 volts, 3 ph 60 cy 59 amp. Serial #ZK13566.1.

1—G.E. Induction Motor type KT 326-8-25-1200 Form B 3 ph 60 cy 220 volts 25 HP 61 amp. 1200 RPM Ser. #1063834 complete with one G.E. OIL Switch type F Form K20 50 amp 600 v Ser. #360400.

1—G.E. Starting Compensator CR1054 220 volts 3 ph 60 cy type NR 1622.

1—G.E. Induction Motor (slipring) Frame 15A 150 HP Form M 720 RPM 2200 v. 3 ph 60 cy 36 amp Ser. #1180132.

1—G.E. Induction Motor (slipring) Frame 15A 150 HP Form M 720 RPM 2200 v. 3 ph 60 cy 36 amp.

1—Westinghouse 30 HP D.C. Motor 220 volts 117 amp. 975 RPM Ser. #223561.

1—G.E. Motor DC Type MP Form H 20 HP 1025 RPM 230 volts 70 amp. Ser. #19850, complete with manual starting equipment.

1—104" Sheet Cutter complete with stands for 10 rolls, and layboy.

1—G.E. Motor DC Type RC30 Form A 15 HP 850 RPM 230 volts 53.5 amp. Ser. #367750, complete with variable speed control for armature and field.

1—G.E. Motor DC 7.5 HP 230 volts 30.2 amp 850 RPM Type RC-29A Form A29 Ser. #1148541.

1—G.E. Motor DC 10 HP 230 volts 375.1 amp 850 RPM Type RC 29 Form A29 Ser. #1148660.

1—Westinghouse DC Motor Type S 5 HP 220 volts 21 amp. 1300 RPM Ser. #112692.

1—G.E. Motor DC 35 HP 129 amp. 230 volts 700 RPM DLC 202 Form A Compound Ser. #434542, complete with starting control.

1—G.E. Induction Motor (slipring) Type 1E 13AA-4-150-1060 FORM M 3 ph 60 cy 2200 volts 150 HP 34.5 amp 1745 RPM Ser. #3884576 complete with panel. One G.E. Switch Panel type ATI 80006, one Drum Controller and Resistance variable speed.

1—Master Electric Worthington Pump and Motor. Pump is good for 100 gal. per minute 5 HP Motor 230 volts DC 3425 RPM Ser. #CC-3495.

1—Robbins & Myers Hoist ½ HP 230 volts DC 400 RPM Ser. M71300KH.

1—Master Electric Gear Head Motor 1 HP 230 volts DC 1725 RPM Ser. CE863.

1—Shepard Liftabout Electric Hoist 2,000 lb. capacity 230 volts DC Serial #11339.

1—Wright Electric Hoist 1,000 lb. capacity 230 volts DC 1200 RPM Ser. #27668.

3—ILG Ventilating Fans ¼ HP 230 volts DC 855 RPM.

2—G.E. CP27 Compressor Head Air Pumps 230 volts DC Complete with pressure line switches.

1—Allis-Chalmers DC Motor 5 HP 220 volts 1050 RPM Ser. 44057.

1—Westinghouse DC Motor 10 HP 40 amp. 230 volts 1725 RPM Frame 60L Ser. #143851.

1—Daniels Rag Cutter #2.

1—Horizontal Rotary Digester 7' dia., 22' long with gearing reduction.

1—Horizontal Rotary Digester 8' dia., 20' long with gearing reduction.

1—Bucket type conveyor elevator. Buckets size 5" x 17", approximately 48' long, lifts on incline approx. 15°. All steel construction with Rex Chain Drive, complete with one Foote Bros. gear reducer type 2SW 43 to 1 ratio, ser. 188052, driven by one G.E. DC Motor type RC27A Form A-38 3 HP 10.1 amp 230 volts 1150 RPM.

1—R40 Reducer, 12 to 1 ratio.

1—Silpring motor 75/150 HP Type CW 3 ph 60 cy 2200 volts 250/500 RPM Ser. #2224079, complete with starting equipment.

1—Slat conveyor steel construction 4' wide, 3' high, 42" long, driven by one Jones Spur Gear Reducer, ratio 27 to 1, Ser. #10135. Driven by one Sprag Electric DC Motor type LC 10 HP 37.2 amps 230 V 100 RPM Ser. #DL 2002213, complete with sheaves and V Belt drive, one Westinghouse Automatic Starter.

1—John Waldron Embosser #711.

1—Thorpe Hydraulic Press complete with 4 steam platen plates 40" x 40", and one Equalizer Pump.

1—Five cylinder Holyoke Duster.

1—Two-color Kidder Rotary Press, with various plates and printing rolls.

3—Beaters, 1000 lb., cast iron tub, complete with roll.

2—Beaters, high speed, 2000 lb., cast iron tub, complete with roll.

1—Banded type Emerson Beater Roll, 54" face, 36" diameter, complete with stands.

MISC.

Platform Scales.
Paper Testing Equipment.
Two-wheeled hand trucks.
One Shartle Bros. Duplex Stock Pump 8 x 16.

TF

FOR SALE

1—Warren Improved 2 drum winder with top and bottom slitters. Trims 105"
2—Calender rolls, 12" dia., 88" face, 6" journals
2—Rubber covered press rolls 18" dia., 80½" face. Journals 7" dia., 9" long, 84" between shoulders.
1—Ryther & Pringle paper duster. 8'x6'x 16'.
1—Brass press roll 18" dia., 80½" face 84" between shoulders
1—Granite press roll 18" dia., 80½" face, 84" inches between shoulders
1—Fan pump 12" inlet, 8" outlet
1—Split pulley 72" dia., 20" face. Extra heavy
1—Split pulley 60" dia., 19" face. For Brownell twin engine
6—4" Moore & White expansion winder shafts. 2—19", 2—31", 2—46"
2—10 plate flat screens. 2—12 plate flat screens
1—American Thompson Improved Indicator (For steam engines)
1—250 gal. Worthington pump, direct connected to 15 HP G. E. Motor 60 cycle 3 phase 220 volts with starter and panel
2—75 HP G. E. Motors 600 rpm, 60 cycle 3 phase 440 volts

FRANK P. LYDEN
Fort Edward, N. Y. O-17

PULP & PAPER MILL FOR SALE

Well located pulpwood supply—good water power, News, Specialties. Also small Specialty Mill. Address Box 46-698 care Paper Trade Journal. O-17

FOR SALE—Approximately one Carload (12 tons) clean, bleached, unprinted, new waxing broke in bales located New York State. Advise best offer. Address Box 46-706 care Paper Trade Journal. O-24

MACHINERY FOR SALE

2—Impco Pulp Screens of design No. 3.

2—Gould, size 8", double suction centrifugal pumps mounted on baseplates but without motors. These pumps are Fig. 3480, rated 1000 GPM at 25 ft. head and require a 15 HP 1200 RPM motor. One pump is new and one pump is slightly used but in good condition.

3—Saranac Oyster-pail machines, hopper feed.

2—Saranac Butter-dish machines, hopper feed.

STEVENS & THOMPSON PAPER COMPANY
Greenwich, New York
TF

FOR SALE

2—No. 55—72"x18'—Erie city return tubular boilers. 125# pressure each rated 156 H.P. Purchased new Sept. 1941.

KEUKA PAPER CORP.
Penn Yan, N. Y.
O-17

FOR SALE

PAPER MACHINE STEAM TURBINE DRIVE

230 H.P. Terry GA Turbine and Gear connected to 24" diameter pulley all on one solid base. Steam inlet 150 pounds. Back Pressure 25 pounds.
With Woodward Governor for speed control through wide range.
This unit is in excellent mechanical condition and a fine buy for anyone needing a paper machine drive for immediate shipment.

FERNSTROM PAPER MILLS, INC.
POMONA, CALIFORNIA
TF

FOR SALE—Two J. H. Horne Large Type Jordans, one arranged for belt drive and the other for direct connection to a motor. Address Box 46-655 care Paper Trade Journal. O-10

FOR SALE—1 Hamilton-Corliss Variable Speed Twin Engine, size of cylinders 12" x 24" Also Triple-Deck Frames for ninety 36" dryers any width. The Chesapeake Paperboard Co., Baltimore 30, Md. TF

1—84" Hudson Sharp roll-to-roll Embossing machine, embosses from two rolls at a time; with engraved rolls for "basket weave" and, "ribbed" patterns.

1—40" German disc ruling machine.

1—Modern Clipper Cellophane Bag Machine.

1—30" Late type Model D Fales Slitter and Rewinder equipped with knife setups to cut following widths: ¼, 9/32, 5/16, 11/32, ⅜, 13/32, 7/16 and ½ inches.

1—68" Type 40B Hudson Sharp Toilet Paper Converter. Perforates 5" lengths toilet or 10" paper towels.

3—Single Hamblet Rotary Sheet Cutters, 1—75"; 2—84". Slitting attachment, 8 roll backstands and layboys.

1—84" 3 shaft Model 30B Hudson Sharp Toilet Paper Perforator cutting sheets 4½ x 5, 4½ x 4½, 11 x 15, 11 x 13½, 11 x 7½ inches. Known as a hard wound roll machine.

4—Complete spiral tube winders with automatic cut-offs, also recutters. 2 Langston and 2 Knowlton manufacture.

GIBBS-BROWER COMPANY, INC.
21 East 40th St., New York 16, N. Y.
TF

FOR SALE

48" Meisel Spot Shooter with Layboy
64" Waldron Drum Rewinder
44" x 64" Sheridan Die Cutter Model #25
Hayssen Heat Seal Carton Wrapper
28" x 38" Seybold Embosser & Die Cutter
63" & 74" Langston Cut-Off Knives
36" x 58" Cottrell Die Cutter
38" Rotary Printer, Sgle. Color

Write for bulletin listing 70 machines for paper converting and box manufacturing now available.

SOUTH WABASH ENGINEERING CO.
2929 S. Wabash Ave., Chicago, Illinois
O-10

WANTED

WANTED:

PAPER MILL

To Be Used For The Manufacture of Folding Boxboards. Must Be Within 250 Miles of N. Y. Output 25-100 Tons Daily—Cash Transaction. Address Box 46-716 Care Paper Trade Journal. 0-10

BLEACHED PAPER WANTED

Large Converter requires additional Source of Supply for Bleached Fourdrinier Paper. Large tonnage desired. Prepared to contract for long term or invest substantial sum in return for tonnage commitment. Important able to deliver quickly.

Address Box 46-710 care Paper Trade Journal O-24

WANTED—Large diameter dryer, 132" face or somewhat larger, diameter preferably six or seven feet. Fort Howard Paper Company, Green Bay, Wisconsin. O-10

PAPER MANUFACTURER desires to purchase or invest in converting business of standard paper products. Address Box 46-708 care Paper Trade Journal. TF

WANTED

NEWSPRINT EMERGENCY

Shun Pao, China's leading daily newspaper, urgently needs newsprint. Small or large amounts. Cash. Will also contract for future supply.

Telephone or Wire

Hiram Merriman

84 William St., New York 7 Worth 2-2800

O-10

WANTED

Complete heavy duty paster or laminator of approximate 65" face for boxboard. Must have stands with heavy duty cut-off knife and slitter arm all in good condition. Write full details to Rockford Paper Mills, Inc., Rockford, Michigan. O-10

WANTED TO BUY

Bond, Offset, Index, Manifold Ground Wood, Printing paper, Kraft, Glassine, Tissue, etc. Rolls or sheets. Box No. 46-680 care Paper Trade Journal. O-24

WANTED—Die Press Waxing Machine and Cameron Rewinder. Address Box 46-701 care Paper Trade Journal. O-10

WANTED—Roll Grinder for rolls up to 132" face and 30" diameter. Must be in good condition. Motors to be 3/60/440. Address Box 46-638 care Paper Trade Journal. N-7

WANTED TO BUY—Tissue Mill in running condition with or without pulp contract. Principals only. State location, price and full particulars. Address Box 46-715 care Paper Trade Journal. O-31

WANTED—Brightwood Box Machine. Address Box 46-33 care Paper Trade Journal. TF

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of PAPER TRADE JOURNAL, published weekly at East Stroudsburg, Pa., for October 1, 1946.

State of New York } ss.:
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Arthur E. Gordon, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the PAPER TRADE JOURNAL and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation) etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, George E. Lockwood, 15 West 47th st., New York 19, N. Y.; Editor, Wilfred L. Cook, 15 West 47th st., New York 19, N. Y.; Managing Editor, None; Business Manager, Arthur E. Gordon, 15 West 47th st., New York 19, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Lockwood Trade Journal Co., Inc., 15 West 47th st., New York 19, N. Y. Stockholders: Geo. E. Lockwood, 15 West 47th st., New York 19, N. Y.; A. J. Pearson, 15 West 47th st., New York 19, N. Y.; Samuel Mayer, 15 West 47th st., New York 19, N. Y.; John Banninga, 15 West 47th st., New York 19, N. Y.; T. R. Lasser, 15 West 47th st., New York 19, N. Y.; Edythe Z. Ellison, 15 West 47th st., New York 19, N. Y.; Mrs. Marion C. Zabriskie, 15 West 47th st., New York 19, N. Y.; George Saxe Macdonald Trust, Bankers Trust Co., 16 Wall st., New York 5, N. Y.; Geo. E. Lockwood, J. K. Lasser, 15 West 47 st., New York 19, N. Y., Trustees.

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is ——. (This information is required from daily publications only).

ARTHUR E. GORDON.
(Signature of Business Manager.)

Sworn to and subscribed before me this 27th day of September, 1946.

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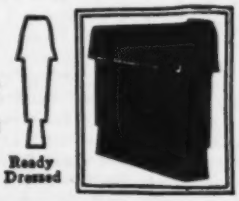

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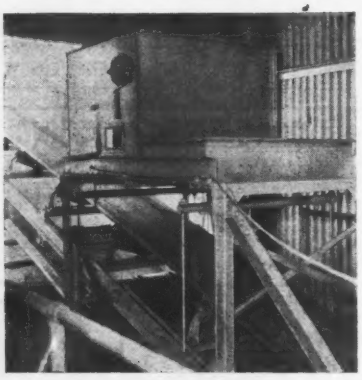

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National Aniline Division, Allied Chemical & Dye Corp.
Paper Makers Chemical Department, Hercules Powder Co.
C. K. Williams & Co.
Witco Chemical Co.

EMBOSSING ROLLS

Northern Engraving & Mch. Co.
Roehlen Engraving Works

EVAPORATORS

Black-Clawson Company
Foster Wheeler Corp.
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

FANS

General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS

Fibre Making Processes, Inc.
Hardinge Co., Inc.
Merrick Scale Mfg. Co.
Leeds & Northrup
Wallace & Tiernan

FELTS

Appleton Woolen Mills
Asten-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co., Inc.
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.

FELT CONDITIONERS

Steamaire Company

FELT GUIDES

Moore & White Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS

Aluminum Flake Co.
American Colloid Co.
Amer. Cyanamid & Chem. Corp.
Amer. Resinous Chemicals Corp.
Johns-Manville Sales Corp.
W. H. Loomis Talc Corp.
Vanderbilt Co., R. T.
Witco Chemical Co.

FILTERS

Cochrane Corp.
Hardinge Co., Inc.
Moore & White Co.
J. O. Ross Engrg. Corp.
Witco Chemical Co.
Worthington Pump & Machy. Corp.

FLOORING, GRATING & TREADS

Hendrick Mfg. Co.
Klemp Co., W. F.
Norton Co.
Raybestos-Manhattan Inc.
Manhattan Rubber Division
United States Rubber Co.

FORMING MACHINES

Downingtown Mfg. Co.
Noble & Wood Machine Co.
Oliver United Filters
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
South Wabash Engrg. Co.

FRICTION MATERIALS

Johns-Manville Sales Corp.

FREENESS TESTERS

Testing Machines, Inc.
Williams Apparatus Co.

GEARS

Black-Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

GRINDERS

Carthage Machine Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Wks.

GRINDING WHEELS

The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Norton Company
United States Rubber Co.

HEAT EXCHANGERS

Foster Wheeler Corp.

HEAT RECOVERY SYSTEMS

Foster Wheeler Corp.
Stickle Steam Specialty Co.

HEATING, VENTILATING AND AIR CONDITIONING

The Appleton Machine Co.
Armstrong Machine Works
Cochrane Corp.
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Ross Engineering Corp., J. O.
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Valley Iron Works Co.
Worthington Pump & Machy. Corp.

HOISTS

Appleton Machine Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones & Sons Co.
Reading Chain & Block Corp.

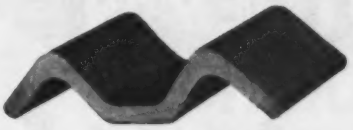
HOSE (Air, Water, Suction, etc.)

The Cincinnati Rubber Mfg. Co.
Raybestos-Manhattan Inc.
Manhattan Rubber Division
United States Rubber Co.

WHERE TO BUY

HUMIDITY CONTROL
Spray Engrg. Company
Steamaire Company
HYDRAPULPERS
Ross Paper Machy. Co.
INSTRUMENTS, TESTING AND MEASURING
Bauer Brothers Co.
N. P. Bowsher
The Bristol Company
Cochrane Corp.
The Foxboro Company
General Electric Company
W. & L. B. Gurley
Leeds & Northrup Company
National Technical Laboratories
B. F. Perkins & Son
Taber Instrument Corp.
Taylor Instrument Cos.
Testing Machines, Inc.
Wallace & Tiernan Instrument Co.
Williams Apparatus Co.
INSULATION
Johns-Manville Sales Corp.
JOINTS
Perfecting Service Company
JORDAN FILLINGS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
KNIVES
Black-Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
Valley Iron Works Co.
KNOTTERS
Fibre Making Processes, Inc.
LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
The Biggs Boiler Works Co.
W. H. & L. D. Betz
Dilts Machine Works
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Taber Instrument Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works
Williams Apparatus Co.
LAY BOYS
Hamblet Machine Co.
Moore & White Co.
Shartle Brothers
LINTER COTTON
The Railway Supply & Mfg. Co.
LUBRICANTS
Gulf Oil Corporation
Gulf Refining Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Inc.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.
LUBRICATORS
Hills-McCanna Co.
MATERIAL HANDLING
Automatic Transportation Co.
Brooks Equipt. & Mfg. Co.
Northwest Engrg. Co.
Reading Chain & Block Company
MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Montague Machine Co.
Lobdell Car Wheel Co.
Testing Machines, Inc.
Walker-Goulard-Plehn Co.
MOISTENING EQUIPMENT
The Spray Engineering Co.
Steamaire Company
MOISTURE CONTENT CONTROL
Spray Engrg. Company
Steamaire Company
Stickle Steam Specialty Co.
Williams Apparatus Co.
MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
Continental Electric Co.
De Laval Steam Turbine Co.
General Electric Co.
Ingersoll-Rand Co.
Reliance Electric & Engrg. Co.
Westinghouse Electric Corporation
NOZZLES
Spray Engrg. Company
Steamaire Company
PACKING BOXES
Johnson Corporation
Shartle Brothers Machine Co.
PACKING
Johns-Manville Sales Corp.
The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
United States Rubber Co.

PAPER MACHINES
Bagley & Sewall Co.
Black-Clawson Company
Downingtown Mfg. Co.
Thomas W. Hall Co.
Moore & White Co.
Pusey & Jones
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
PAPER MACHINE SLICES
Black-Clawson Company
E. D. Jones & Sons Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Wks.
Valley Iron Works Co.
PAPER MILL BUILDERS
Merritt-Chapman & Scott Corp.
The Rust Engrg. Co.
PAPER TUBE MACHINERY
Theo. Adams
Dietz Machine Works
Thomas W. Hall Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.
South Wabash Engrg. Co.
PASTING MACHINES
Black-Clawson Company
Davis, Frank H., Co.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
South Wabash Engrg. Co.
Waldron Corp., John
PENSTOCKS, WELDED STEEL
The Biggs Boiler Works Co.
PERFORATED METAL
Allis-Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
PIPE
Black-Clawson Company
Crane Company
Deublin Company
Grinnell Company
Johns-Manville Sales Corp.
Shartle Brothers Machine Co.
Stowe-Woodward, Inc.
Taylor Forge & Pipe Works
Walworth Company
PLATERS
Perkins & Son, Inc., B. F.
PLATES
Black-Clawson Company
Hendrick Mfg. Co.
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Timken Roller Bearing Co.
PLATE WORK (Steel & Alloy)
The Biggs Boiler Works Co.
PLUGS
Black-Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.
PRESSURE VESSELS, STEEL AND ALLOY
The Biggs Boiler Works Co.
Foster Wheeler Corp.
PRESSES
Black-Clawson Company
Dietz Machine Works
Farrel-Birmingham Co.
Fibre Making Processes, Inc.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
Rotogravure Engineering Co.
Shartle Brothers
South Wabash Engrg. Co.
Valley Iron Works Co.
Waldron Corp., John
Weber, Herman G.
Williams Apparatus Co.
PULPERS
Bauer Brothers Co.
PULPS
Andersen Co., J.
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Elof Hansson, Inc.
Lyddon & Co. (America) Inc.
Parsons & Whittemore, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.
PULPSTONES
Norton Company
PUMPS
Allis-Chalmers Mfg. Co.
Black-Clawson Company
Buffalo Pumps, Inc.
Dorr Company



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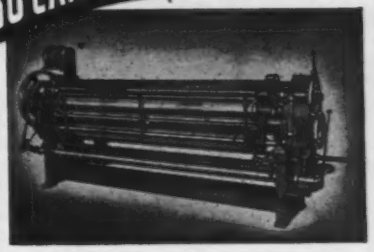

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★ CREPE MACHINES Tissue, Kraft, Waterproof.

★ BUNDLING PRESSES. Adjustable, Napkin, Multi-Wall Bag.

★ MISCELLANEOUS. Toilet Roll Wrappers, Vacuum Pumps, Seat Cover Machines, Die Inkers, Core Machines, Core Recutters.

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FOLDERS
Towel, Tissue, Napkin, Wax, Facial Tissue, Table Covers.

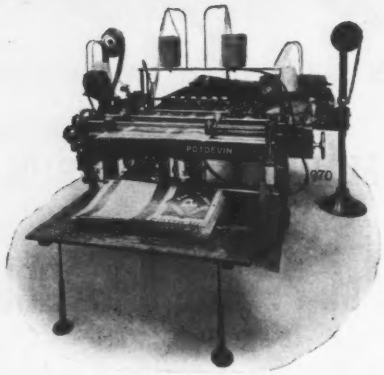
EMBOSSERS
1. Glassine. 2. Board. 3. Towel. 4. Tissue. 5. Napkin. 6. Wrapping. 7. Special Purpose

WINDERS
Toilet, Towels, Crepe, Jumbo Roll.

Write us any time about your machinery requirements.

PAPER CONVERTING MACHINE CO.
GREEN BAY, WISCONSIN

POTDEVIN



SEWING MACHINE

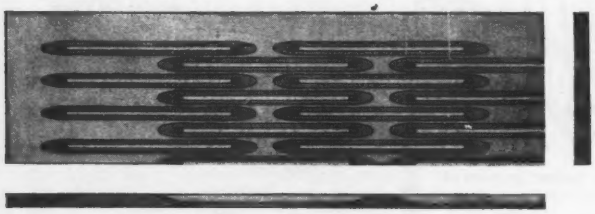
FOR

sewing selvage on both ends of pre-valved, multi-wall tubes used as containers for such bulk products as cement, fertilizer, chemicals, feed and others similar.

POTDEVIN MACHINE CO.
EST. 1893
1223 38TH ST BROOKLYN N Y

POTDEVIN

For every screening operation



. . . . in paper and pulp mill

Hendrick Milled Slot Screens are furnished in bronze, copper, Monel, or stainless steel, with slots cut accurately to size and heavy relief on underside to assure efficient screening. Available slot widths range from .010" upward.

Hendrick also makes perforated plates in the same metals for paper mill screens, with round perforations in a range of sizes, increasing by increments of .005", from .04" to .125" in diameter, and also with larger size perforations. Write for detailed information.

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and Armorgrids.

HENDRICK
Manufacturing Company
50 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities

WHERE TO BUY

Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hardinge Co., Inc.
Hills-McCanna Co.
Ingersoll-Rand Co.
Johnson Corp.
Moore & White Co.
Merris Machine Works
Nash Engineering Co.
Noble & Wood Machine Co.
Paper Converting Mch. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Steamaire Company
Warren Steam Pump Company
Worthington Pump & Mchy. Corp.

RAG CUTTERS
B. F. Perkins & Son, Inc.
Taylor-Stiles & Co.

RECOVERY SYSTEMS
Bulkley, Dunton Pulp Co., Inc.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones
Ross Engineering Corp., J. O.
Valley Iron Works Co.

REELS
Black-Clawson Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Company
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Rodney Hunt Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
The Hermann Manufacturing Co.
E. D. Jones & Sons Co.
Murray, D. J., Mfg. Co.
Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout, Waldron & Co.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Bristol Company
The Brown Instrument Co.
Cochrane Corp.
The Foxboro Company
Jones, E. D., & Sons Co.
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Shartle Brothers
Stickle Steam Specialties Co.
Taylor Instrument Companies
Wallace & Tiernan
Westinghouse Electric Corporation

RESINS
Amer. Cyanamid & Chemical Corp.
Amer. Resinous Chemicals Corp.
Monsanto Chemical Co.
The Resinous Prod. & Chem. Co.

ROLLS
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Machy. Corp.
Lobdell Co.
Montague Machine Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Perkins, B. F., & Sons Co.
Philbrick Engrg. & Machine Co.
Pusey & Jones Corp.
Raybestos-Manhattan Inc.
Manhattan Rubber Division
Roehlen Engraving Works
J. J. Ross Company
Ross Paper Machy. Co.
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Sinclair Co.
Smith & Winchester Mfg. Co.
Stearns Magnetic Mfg. Co.
Stowe-Woodward, Inc.
United States Rubber Co.
Valley Iron Works Co.
Waldron Corp., John

ROLL COVERS
The Cincinnati Rubber Mfg. Co.
Stowe-Woodward, Inc.

ROLL STANDS
Cameron Machine Co.
The Kohler System Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
South Wabash Engrg. Co.

ROOFING MATERIALS
Johns-Manville Sales Corp.

ROTARY BOILERS
Biggs Boiler Works

SATURATING MACHINES
Black-Clawson Company
Moore & White Co.
Noble & Wood Machine Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bulkley, Dunton Pulp Co., Inc.

SCALES
Merrick Scale Mfg. Co.

SCREEN PLATES
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.
Union Machine Co.
Union Screen Plate Co.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Harrington & King Perforating Co.
Hendrick Manufacturing Co.
E. D. Jones & Sons Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Valley Iron Works Co.

SHEET MACHINES
Thomas W. Hall Co.
The Hermann Manufacturing Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
Valley Iron Works Co.
Williams Apparatus Co.

SHOWER PIPES
Bird Machine Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
Improved Paper Machy. Corp.
Moore & White Co.
Shartle Bros. Mach. Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.

SIZING
Amer. Cyanamid & Chemical Co.
Amer. Resinous Chemicals Corp.
Black-Clawson Company
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Flintkote Company
Kelco Company
Monsanto Chemical Co.
National Oil Products Co.
Paper Makers Chemical Department, Hercules Powder Co.
Philadelphia Quartz Co.
Pioneer Salt Company
Socony-Vacuum Co.
Stein, Hall & Co., Inc.

SLIME CONTROL
Falls Chemical Products Co.
Magnus Chemical Co.
Mallinckrodt Chemical Wks.

SLITTERS
Theo. Adams
Black-Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Smith & Winchester Mfg. Co.
South Wabash Engrg. Co.
Valley Iron Works Co.
Waldron Corp., John

SMOKE STACKS
The Biggs Boiler Works Co.

SOLENOID VALVES
Steamaire Company

WHERE TO BUY

SPRAYING EQUIPMENT
The Spray Engineering Co.
Bennaire Company
STAINLESS STEEL
Anti-Corroeive Metal Products Co., Inc.
STARCH
Amer. Cyanamid & Chemical Corp.
Clinton Industries, Inc.
National Starch Products, Inc.
Stein, Hall & Co., Inc.
STATIC ELIMINATORS
Bennaire Company
STEAM SPECIALTIES
Babcock & Wilcox Co.
Cochrane Corp.
Johnson Corp.
Perfecting Service Company
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.
STEEL TANKS
The Biggs Boiler Wks. Co.
STRAPPING & STRAPPING MACHINES
Acme Steel Company
The Stanley Works
STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Valley Iron Works Co.
SUCTION BOXES
Black-Clawson Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Westinghouse Electric Corp.
SULPHUR
Amer. Cyanamid & Chemical Corp.
Stauffer Chemical Company
Texas Gulf Sulphur Co.
Witco Chemical Company
SULPHUR BURNERS
Valley Iron Works Co.
SULPHUR DIOXIDE
Ansul Chemical Company
SUPERCALENDERS
B. F. Perkins & Son, Inc.
TALC
Amer. Cyanamid & Chemical Corp.
W. H. Loomis Talc Corp.
TANKS
Cochrane Corp.
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Noble & Wood Machine Co.
Raybestos-Manhattan Inc.
Manhattan Rubber Division
Rodney Hunt
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Stowe-Woodward, Inc.
United States Rubber Co.
Waldron Corp., John
B. F. Perkins & Son, Inc.
Testing Machines, Inc.
THICKENERS, DECKERS AND SAVEALLS
Bird Machine Company
Bulkley, Dunton Pulp Co., Inc.
Carthage Machine Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Hardinge Co., Inc.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Valley Iron Works Co.
TITANIUM
E. I. du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.
Witco Chemical Company
TOOLS
Acme Steel Company
Ingersoll-Rand Co.
The Stanley Works
Walworth Company
TRUCKS
Automatic Transportation Co.
TRAPS
Armstrong Machine Works
Cochrane Corp.
Crane Co.
Grinnell Company.
Johnson Corporation
Shartle Bros. Mch. Co.
Stickle Steam Specialty Co.
TUBS
Rodney Hunt Machine Co.
Noble & Wood Machine Co.
Shartle Brothers
Valley Iron Works Co.
TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.
Westinghouse Electric Corp.
Worthington Pump & Machy. Corp.
TURPENTINE RECOVERY
Foster Wheeler Corp.
USED EQUIPMENT
Frank H. Davis Company
Gibbs-Brower Co.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
Ross Paper Machinery Co.
Shartle Brothers Machine Co.
VALVES
The Bristol Company
Cochrane Corp.
Crane Company
Dilts Machine Works
Fibre Making Processes, Inc.
The Foxboro Company
E. D. Jones & Sons Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Permutit Company
William Powell Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Taylor Instrument Companies
Valley Iron Works Co.
Walworth Company
VALVES, LUBRICATED PLUG
American Car & Foundry Co.
VATS & VAT PARTS
Union Machine Co.
Union Screen Plate Co.
WASHERS
Bird Machine Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Wks.
Rodney Hunt Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.
WATER CONDITIONING
Cochrane Corp.
The Permutit Company
WATER DISPERSIONS
American Anode, Inc.
WAXING MACHINERY
Black-Clawson Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.
WELDING EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Company
Walworth Company
Westinghouse Electric Corp.
WET MACHINES
Black-Clawson Co.
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
Montague Machine Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
WINDERS AND REWINDERS
Black-Clawson Company
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co.
Hudson-Sharp Mach. Co.
Langston Co., Samuel M.
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
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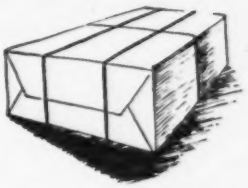

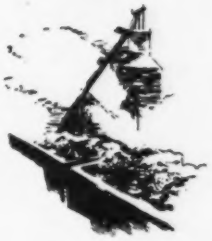

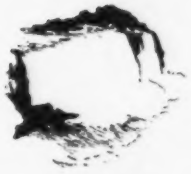

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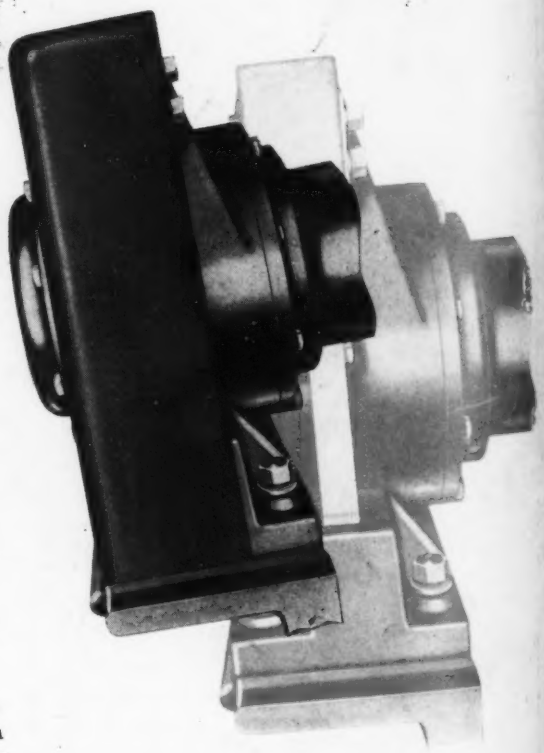

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